

# The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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## The Gogebic Iron Range.

Deservedly wide publicity has been given to the rapid opening up of the great Gogebic iron range. Influenced by the partly well-authenticated tales of sudden accession to great wealth of some of the pioneers and a few of the early speculators, a craze for gambling in iron shares seized the entire population of the Northwest, spreading rapidly to Milwaukee, Cleveland and Chicago, and efforts were made later on to interest the public in St. Louis, New York, Boston and other Eastern cities. The most violent phase of the fever has passed, but there is still a good deal of speculation going on. It is natural that the eagerness of lay journalists to furnish sensational matter should have led to making the majority of the reports in the daily press extravagant and to some extent misleading, especially since those who are working properties for the money they can make on mining iron ore are not likely to be those who inspire newspaper articles, or are ever ready with data. The result has been that with all its great merit, the Gogebic range

characteristic feature of the Gogebic range, and that which has made it relatively easily explored, is the regularity and persistency of the formation, and the strongly marked character of the footwall country. The footwall varies in dip from 45 to 70 degrees to the north, being flattest in the vicinity of the Sunday Lake mines near Wakefield. The rock immediately underlying the ore belt is what is called a quartzite, a sandstone with enlarged grains of quartz, which is generally firm and strong, but in one locality, in the Pabst, is soft and friable, a circumstance which has led to the troubles recently experienced at that mine. South of this quartzite ore is never found, so that the efforts of prospectors are directed toward its discovery. The quartzite is very regular in thickness and is persistent throughout the range. For 200 feet south of it are found variegated slates, these lying directly on the Laurentian schists or granites. North of the footwall are found concentrations of ore varying from 2 to 240 feet in thickness, then generally follows a layer of mixed ore and gangue quartz which cannot be mistaken for the footwall quartzite. In some cases this merges again into bodies of clean

continuation of the Aurora body at a depth of about 1200 feet. Aside from the fluctuations in the width of the ore bodies, their reduction by the occurrence of horses, their magnitude has been affected in at least one conspicuous instance by the occurrence of a dyke cutting clean across the vein. In one or two cases dykes of this kind have been sunk through and the ore has been discovered under it. Faults of the entire formation have not been directly proven, but their presence in one or two localities is suspected.

### COMPOSITION OF THE ORE.

On an average the Gogebic ores carry about 60 per cent. of iron, the product of some of the mines being above that figure, while carelessness in mining, notably in open pit work, is quickly followed by a decline in the iron contents below it. The South Vein is liable to contain more manganese and apparently in richer bodies near the surface. At the Colby a body of higher manganese ore was found near the surface, while at greater depth at that locality the ordinary grade was developed. So far as the phosphorus is concerned, no law of its dis-

and in the future it is probable that these differences will find some expression, either in the selling price or in deductions for excesses over given maxima. We understand that allowances in weight are now made at Ashland for shipments of ore exposed to rain for any length of time during transit from mine to shipping docks, but is certain that the heavy amount of moisture in the soft Gogebic hematites will prove a lasting drawback to them in the estimation of furnacemen, who must pay for freight on a heavy percentage of water, and use costly fuel to expel it in the furnace.

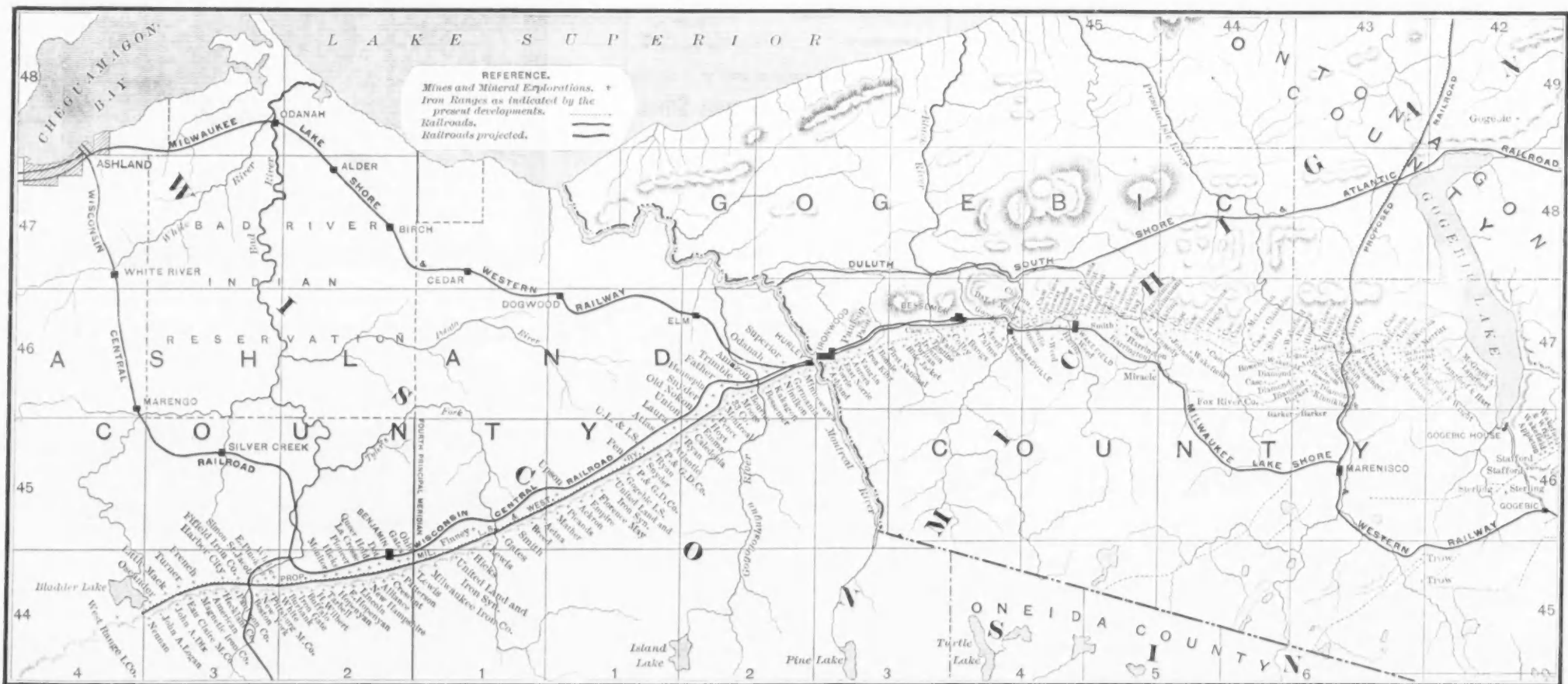
### THE OWNERS OF THE LAND.

East of Hurley the greater part of the land is owned by the Lake Superior Ship Canal, Railway and Iron Company, whose president is T. M. Davis, of New York. This company have the fee of section 27 of the Ashland Mine, which is being worked by parties identified with the Wisconsin Central Railroad, C. Colby being trustee; the East Norrie, the East Aurora, the North Aurora, the Pabst, the First National, worked by the Burton interest; the Puritan, worked by the Puritan Iron Mining Company, J. Sellwood,

by them to the Penokee and Gogebic Development Company for a term of 20 years, is sub-leased to Mather, Morse & Co., H. S. Pickands and J. Sellwood being interested in the firm, which it is understood has again contracted with Joseph Sellwood to mine the ore at a specified price. The lease of Mather, Morse & Co. expires in November, 1888. The mine is now controlled by parties identified with the Wisconsin Central Railroad.

### GOGEBIC MINES AS AN INVESTMENT.

The developments in the Gogebic district may be considered from two standpoints—that of the investor and speculator in individual properties and that of the manufacturer and consumer of iron and steel in its many forms. With the former we have little to do beyond discussing the question to what extent and how speculation is likely to influence the general trade. In its early stages of development, mining is necessarily largely speculative, and while the great prizes fall to a few, the majority of ventures result in the drawing of blanks in the lottery. The Gogebic range has had its phenomenal successes, on the strength of which a large



THE GOGEBIC IRON ORE RANGE.

has to the majority in the iron trade a flavor of speculation which does it injustice. Nearly all the large mines in the district and a goodly number of smaller ones, are now controlled by parties who are either consumers of iron ore themselves or are closely allied with them through many years' business relations, or by men identified with the railroad interest. They do not nor will they appeal to the public as sellers of shares. They constitute the silent conservative element, which shrinks from rather than courts public attention. The other element is as sanguine as past successes can make it, and as the necessity for some exaggeration calls for. The Gogebic range offers to-day exceptional opportunities for investment in legitimate mining enterprises. It can claim and has proven that it deserves to rank as an equal with the older districts as a source of supply for exceptionally pure ores. It has advantages which make it a sharp competitor, at prices as low and lower than the majority of the mines in other districts can bear without loss. Active though explorations have been, and in spite of the ease with which the ore-bearing zone is traced, there are great possibilities in some of the territory in which prospecting is now going on. Freely conceding these facts, it must be insisted that it has its drawbacks, too, and that at the present day a good deal of the property, and especially that controlled by the more speculative element, is offered at an unduly high valuation, a circumstance which we believe must to some extent react upon the district, and upon the Western iron trade generally.

A glance at the accompanying map will show the territory over which the most active explorative work has been carried on. The shipping mines are all located within the shorter distance from Wakefield westward to Bessemer, Ironwood, Hurley to a point about midway between Hurley and Benjamin.

### THE GEOLOGY OF THE DISTRICT.

Mr. J. Parke Channing, of Bessemer, explains the general geology as follows: "The

ore, as at the Colby and Iron King. North of it is found more vein quartzite followed by red slates. Occasionally there is found in this territory layers of unaltered carbonate of iron highly silicious. This is overlain with fragmental black and gray slates, having their greatest development north of the Potato River, where they are known to be 14,000 feet thick. Over them lie non-conformably the Keweenaw trap series. The best exposure of the unaltered carbonates alluded to has been found in the Mikado exploration, where there are about 100 feet of it. One feature of the deposits are interbedded diorites in some parts of the iron range, which are supposed to be intrusive. In lenses of clean ore these layers or dykes of decomposed diorite, which is locally called "soap rock," are often struck. They have not been found to exercise any influence upon the ore. The lenses of ore have irregular boundaries in all directions, ore and vein quartz fingering into each other. This irregularity is so great that it conveys a somewhat erroneous impression to designate the ore bodies by the term of lenses in the generally accepted interpretation of the term. They are not the clean-cut oval bodies found elsewhere, but often merge by gradations from clean ore to ferruginous vein quartz, and are irregular in outline, often cutting off abruptly. The ore bodies generally show a pitch toward the east of about one in five. The aggregations of ore in the neighborhood of the footwall are called the South Vein, while the comparatively rare bodies of merchantable ore nearer the hanging country are called the North Vein. The theory of two distinct, well-defined veins has been quite generally abandoned. No general tendency has been yet discovered in regard to the dimensions of the ore bodies in depth, although in a number of cases a gradual widening has been shown to take place. As to the continuance of the ore in depth no reasonable doubt can exist. The faith in its persistency is well illustrated by the sinking of a shaft on the North Aurora, the Tamerack of the Gogebic district, which it is estimated will reach the

tribution has been discovered. Generally speaking, the product of the district is Bessemer, although the ore of a few of the shipping mines is almost too high in phosphorus to rank as that grade.

Quite a number of analyses have been published of the ores of the Gogebic range, and we had occasion last year to print a number of them obtained from consumers. We have from similar sources the averages of a number of mines of numerous assays from large quantities shipped. We tabulate them as follows:

	Per Cent. Iron.	Phosphorus.	Manganese.
Kakagon	60	0.05 to 0.06	1.50
Germania	60	0.05	1.00
Ashland 1887	61	0.04 to 0.05	1.00
Ashland 1886	64	0.05 to 0.06	1.00
Norrie	62	0.05 to 0.06	1.00
Aurora (open pit), 1887	57	0.035 to 0.04	1.00
Pabst	57 to 61	0.035	1.00
Iron King, north vein	61	0.03	4.00
Iron King, south vein	58	0.04	4.00
Puritan	61 1/2	0.045	3.00
Ironwood	61 1/2	0.045	3.00
Colby	60	0.05	3.00
Anvil	60	0.05	3.00
Sunday Lake	61	0.04	3.00

In some instances lower iron is due to the caving incident to open pit work. The Bonnie, First National, and Blue Jacket are rather high in manganese, and the Odanah shows a tendency to go above the Bessemer limit in phosphorus, carrying from 0.05 to 0.07. It is reported also that in some parts of the Colby property the ore is commencing to crowd the Bessemer limit. The averages presented are rather lower in iron and higher in manganese than is generally claimed by the mines. One matter which will be brought up against the Gogebic mines in the future, when the supply is more liberal and buyers become more critical, is the moisture. In the winter the moisture runs as high as 16 per cent., and 14 per cent. seems to represent the average at that time. During the summer it is from 4 to 5 per cent. less, averaging between 9 and 10 per cent. The quantity, we understand, varies in the different mines between fairly wide limits,

president; the Ironton, mined by the Peur & Snyder Development Company, and the Brotherton, worked by a company with which J. Sellwood is identified. A large area of territory is owned by J. M. Longyear, of Marquette, Mich., who has the fee, together with the J. C. Ayer estate, of the Norrie, worked by the Metropolitan Iron and Land Company, controlled by the North Chicago Rolling Mill Company; the Aurora, a Moore, Benjamin & Co. property; the Anvil, worked by G. E. Tarbell & Co., and the northern half of the southeast quarter section 16 of the Valley Mine, a Burton property. The New York and Lake Superior Canal Company, in which Prof. R. Pumpelly is interested, own the fee of the Iron King, Bonnie, section 18 of the Old Geneva and the Blue Jacket, all Burton properties. The north half of the southwest quarter section 16 of the Valley Mine is owned by the Black River Company, while the Vaughn, a part of the Aurora ground, is owned by Mrs. Vaughn. The Sunday Lake and Iron Chief territory belong to Wakefield, both being Moore, Benjamin & Co. properties, while the Palms is owned by the Francis Palms estate. Miner & Wells control the fee of the Ironton, Tontine, Tilden, East Anvil, and Gogebic. West of Hurley the Wisconsin Central owns every alternate quarter section, its leases providing that the ore must be shipped over that road. This includes the Trimble and the Moore. The 20 year lease on the former is held by E. Ryan, from whom the Pence & Snyder Development Company have it on a five-year lease. The Odanah, which is being worked by the North Chicago Rolling Mill Company interest, is in litigation, so far as the ownership of the fee is concerned. The fee of the Montreal is controlled by Mackay & Vaughn, while the Northern Chief Company, a concern with a capital of \$3,000,000, owns the fee of the Nimikon, Kakagon, Bessemer, and Superior. The fee of the Colby, the greatest shipper in the district, is owned in shares by H. N. Moore, Lieutenant-Governor MacDonald, of Michigan; Mackay, and others. The property is leased

number of worthless schemes have been floated, and some downright swindling has been perpetrated. For a while the craze reached such a pitch that a very large number of "option" stocks were sold at prices as low as 3 cents on the \$1. The speculation in "option" stocks has now practically ceased, and much of the excitement in connection with properties in which fair bodies of ore have been actually uncovered is over. Many of them now parade as "investments" at prices which can only become fairly remunerative to purchasers if exceptionally good fortune attends the enterprises. The arguments put forward in their behalf are based on the records of a few wonderfully productive mines, but it must be remarked that the days of cheap open cut mining on the Gogebic range are virtually over, and that the very properties which turned out their ore at a cost of 50 cents to \$1, delivered on cars, are not now, and cannot be expected to, produce ore in the future at less than \$1 as a minimum. It is stated that last year the Colby, the greatest mine now developed on the range, produced its ore at an average of 87 cents, and that previous to that year its ore cost even less. But it is not too much to say that there is not now on the whole district a single mine which can produce at less than \$1 per ton exclusive of royalty, and that with the majority the cost lies between \$1.50 and \$2. And yet the majority of the shipping mines are valued from \$150,000 to \$750,000. Considering the risks due to uncertainties of the ore deposits themselves, and the chances which must be taken on the selling prices of ore, a return of 20 per cent per annum is a fair profit on such an investment. In other words, a mine valued at \$500,000 would have to ship annually for five years not less than 100,000 tons of ore and make a net profit of \$1 per ton, year in year out, for five years, and then only the investor would have his money returned in the form of dividends without a dollar of interest, the profits on his investment being what the mine

(Concluded on page 9.)



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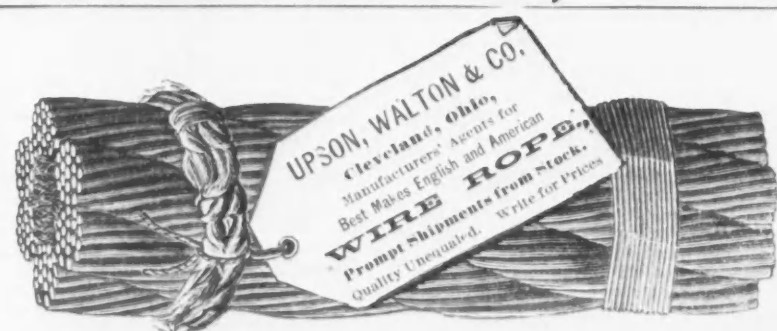
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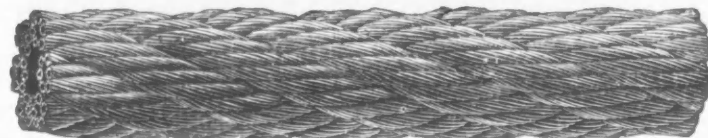
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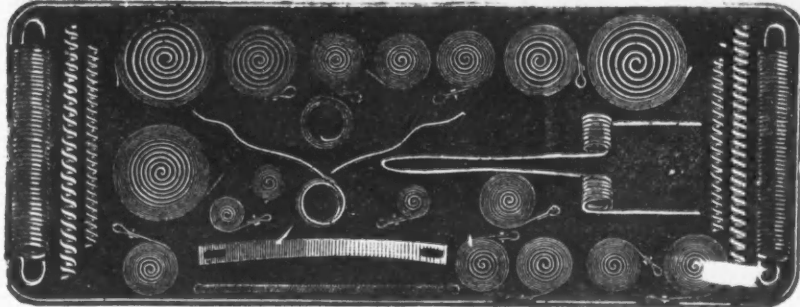
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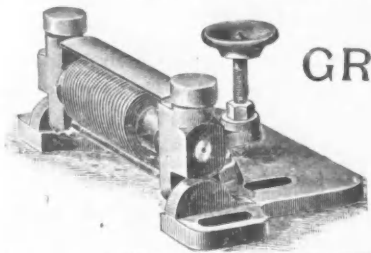
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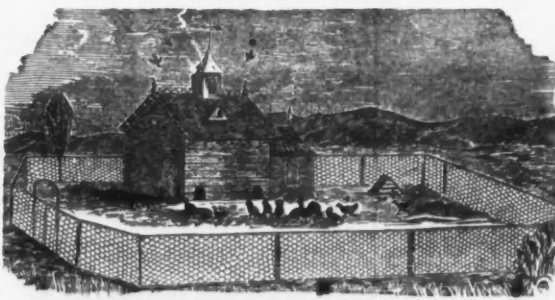
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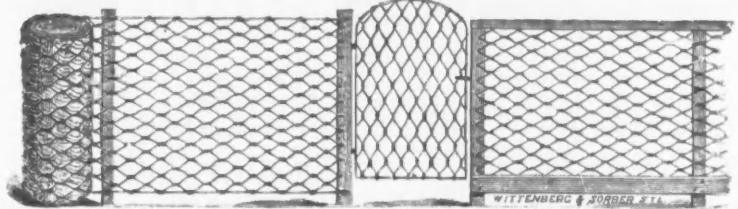


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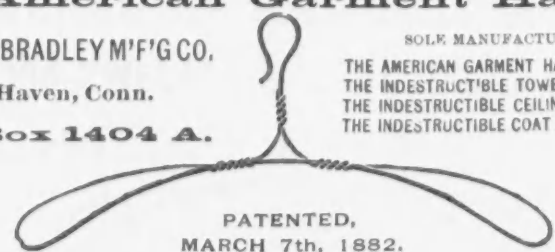
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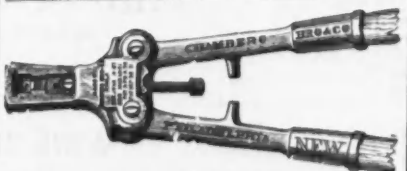
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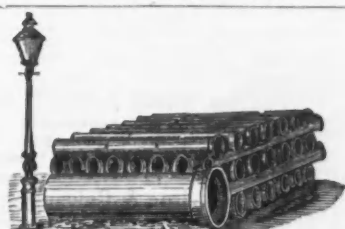
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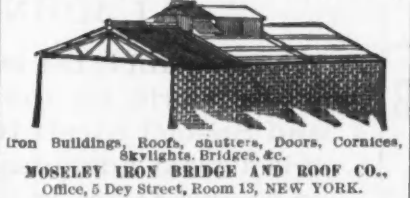
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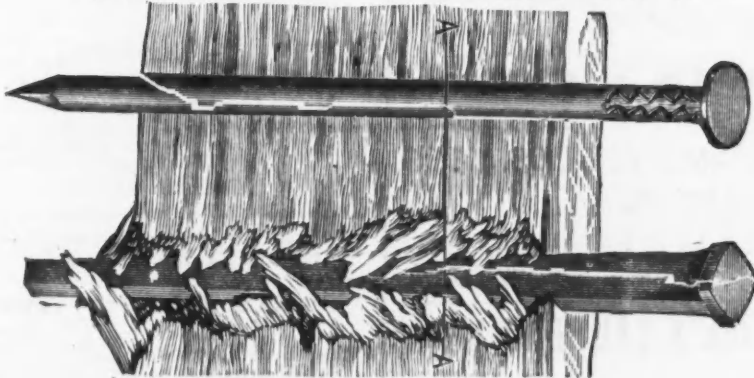
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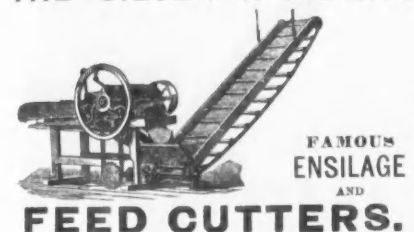
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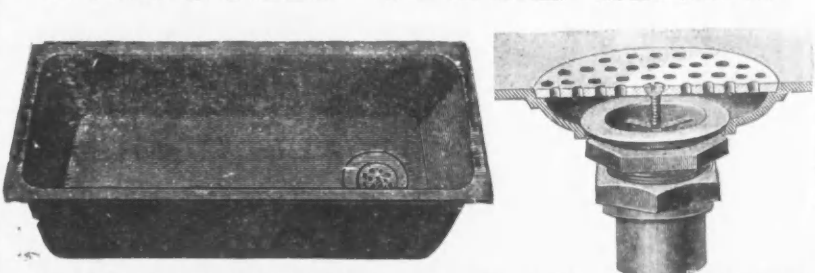
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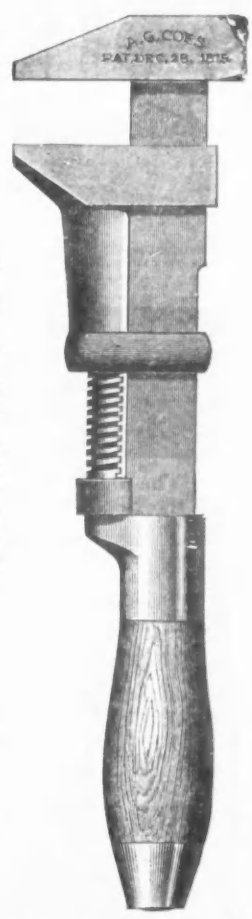
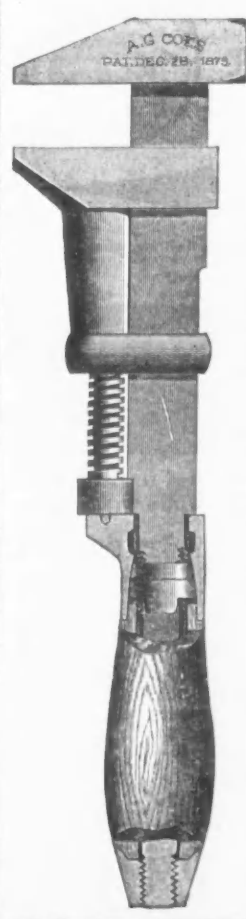
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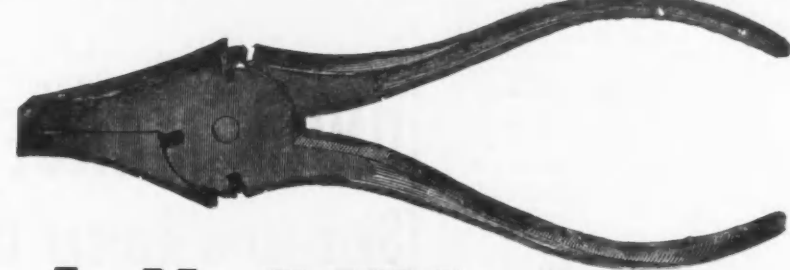
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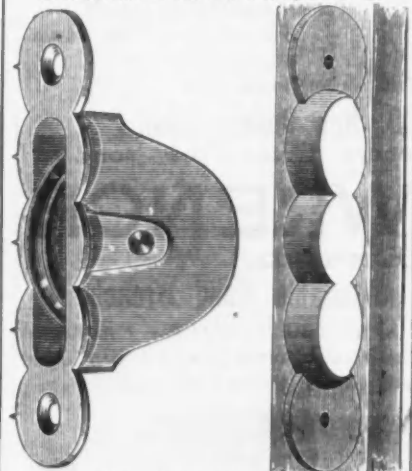
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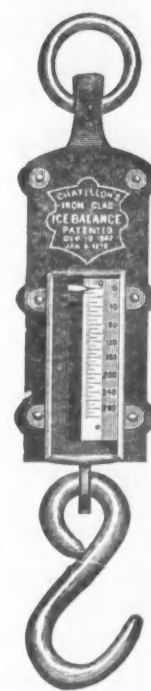
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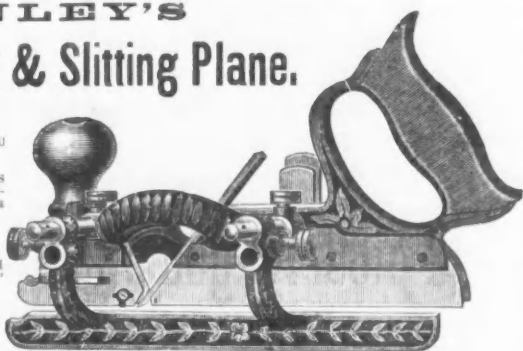
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**C. THOMAS & CO.,** Manufacturers, BIRMINGHAM, CONN.

## The Gogebic Iron Range.

(Concluded from page 1.)

could earn after that time. Of the dozens of properties held at such higher figures, very few indeed give evidence of being able to sustain such a drain on their resources of ore. There can be little doubt that valuations are still far too high in the majority of cases.

We have had the curiosity to estimate how much ore the leading mines would have to produce annually for five years to yield a return of 20 per cent. on their present rated value as expressed by current stock quotations, assuming that there would be a profit of \$1 per ton on every ton of ore shipped. These figures, of course, include a number of mines controlled by parties who are working them for themselves without any reference to what brokers' circulars estimate their stock at. In this way we have added together the nominal values of the Colby, Aurora, Ashland, Anvil, Bessemer, Kakagon, Iron Chief, Sunday Lake, Nimikon, Bourne, Moore, Atlantic, Brotherton, Germania, Iron King, Bonnie First National, Blue Jacket, Valley Ironton, Montreal, Norrie, Odanah, Pabst, Pence, Palms, Superior, Section 33 and Trimble. We find that these mines would have to yield annually for five years not less than 4,056,600 gross tons, at an average profit of \$1 per ton, to pay 20 per cent. on their present nominal valuation. With a profit of \$2 per ton they would have to produce over 2,000,000 gross tons. We question whether any person interested in the district would be rash enough to assert that the mines can accomplish anything near such a feat. Lately, two syndicates have been formed to take over a number of mines and prospects at the following valuations:

Sunday Lake.....	\$100,000	Iron King.....	\$800,000
Iron Chief.....	250,000	Bonnie.....	300,000
Nimikon.....	400,000	First National.....	400,000
Kakagon.....	600,000	Blue Jacket.....	250,000
Bessemer.....	400,000	Valley.....	480,000
Bourne.....	240,000		
Moore.....	240,000		
Atlantic.....	330,000		
		Total.....	\$5,410,000

At 20 per cent. net returns these properties would have to ship for five consecutive years 4,056,600 gross tons of ore at a profit of \$2 per ton before the "investors" would have their money returned without interest. Not one of them approaches in magnitude the Colby, Aurora, Norrie or Ashland. The majority have to work underground exclusively, and all must pay a royalty of 50 cents a ton. Even let it be granted that the consolidation will lessen general expenses, that lake freights will average much lower than they now are, and conceding even that the mines will actually be able to produce over 500,000 tons annually for five years, no well-informed person will believe it possible that they can earn \$2 per ton on the ore. Under such circumstances, at the valuations put forward, the placing of money in securities of this character ceases to be what its promoters dignify it with, an "investment."

## THE EFFECT UPON THE IRON TRADE.

In times of general activity and a heavy demand for ore, the effect of booming is not felt either by those in the district or by the whole trade. But, sooner or later, the markets will decline to figures where profits, even on a moderate valuation, shrink to insignificant figures. In their struggles to keep up dividends on inflated values, the large companies will exhaust every resource. One of the first will be to reduce wages, leading to a conflict in which all will be involved. The speculative concerns will always be the first to aim at combinations and pools, when the markets decline to figures which give them no profit, but leave a good margin to legitimate enterprises. In fact, an argument recently advanced in favor of the consolidation of a number of mines is that, then the "markets can be better protected." The iron trade pretty thoroughly understands what such protection amounts to. The consumers of anthracite coal and of Connellsville coke know what it means, when the control of necessary raw materials is concentrated in the hands of a few, especially when that control has been obtained, as in the case of anthracite, by buying all available lands at ridiculously high prices, even if they cannot be touched for a generation to come. The expulsion of water from inflated enterprises, under the pressure of hard times, is always a protracted, painful and incomplete process, the effects of which are keenly felt by allied industries. If the folly of investors of to-day were visited only upon themselves, their action would cause little concern to others, but every consumer of ore, not protected by having an independent source of supply, will become a fellow sufferer.

## THE COST OF MINING.

So far as the cost of mining is concerned the days of exceptionally cheap ore in the Gogebic range are practically over. Large bodies have undoubtedly been removed in open cuts at low figures, but before the end of the current year few or none of the mines will be operated in this manner. A heavy and continued charge upon the profits of the mines is the royalty. In the large majority of cases the amount is 50 cents per ton, produced generally with the stipulation that the minimum be 10,000 tons for each 80 acres, so that the owners of the fee receive \$5000 annually whether the mine is working or not, the lessee paying all taxes. This weighs particularly on what are merely prospects. In some instances the royalty is arranged on a sliding scale, the basis of the scale being the selling price at Cleveland; the minimum being 7 per cent on a \$5 selling price, advancing one per cent. for each dollar advance. The lease of the Valley Mine contains a clause, that the lessor shall have the option of deciding, before November, whether he will elect to make the basis for the scale the opening prices of ore in Cleveland in the spring of the year, or whether he will choose the average price at Cleveland for the whole shipping season. In the flush of the early excitement little thought was probably given to the charge thus permanently saddled on the whole district, the royalty in at least one case being 75 cents a ton. But it will not take long before the mining companies discover that in the long run the owner of the fee has by all odds the best part of the bargain.

Since the foregoing was written we have received the following figures as showing the sliding scale under which the East Norrie, Pabst, Vaughn, First National, Paritan, Ironton, Tontine, Colby Section 15, Gogebic, and Brotherton work under leases from the Lake Superior Ship Canal Railway and Iron Company:

Cleveland Value.	Royalty.	Cleveland Value.	Royalty.
\$1.00.....	21.00¢	\$3.25.....	37.51¢
1.25.....	25.50¢	5.50.....	41.35¢
1.50.....	29.25¢	5.75.....	44.56¢
1.75.....	33.00¢	6.00.....	48.00¢
5.00.....	35.00¢		

The royalty goes on increasing in this manner up to \$8, when it amounts to 80 cents. The canal company, finding difficulty in arriving at the Cleveland value of ore and the adjustment of rates, have recently given applicants for options a fixed rate of 50 cents per ton, and to those who hold options on the sliding scale they have given the right to elect between the two rates of royalty.

It is a difficult and somewhat delicate matter to put forward any estimate of the cost of mining in the district. Figures of what has been done in the past are somewhat more freely tendered than data concerning actual cost at the present time. It must be remembered, too, that a good many of the mines are really in the early stages of development, and that therefore the first years must necessarily carry more than their share of deadwork expenses. Managers on the Gogebic range appear to follow the custom also of putting their outlay for plants directly into current cost. On the other hand, the figures given for cheap surface mining furnish practically no criterion for present or prospective cost. Nor do the results at a few of the large mines allow of conclusions concerning the prices at which ore can be extracted at the mines having smaller bodies of ore, they, after all, constituting the greater majority, and furnishing a heavy quota in the aggregate to the shipments. Again, in their eagerness to take advantage of the high prices for ore, and in the case of some of them to make a record to aid stock operations, careless and costly work has been done, which tended to enhance costs then, and will add, and in some instances has already added, no inconsiderable sum to the expense attending the extraction of ore. All these considerations, as will be readily appreciated, make any estimates precarious and render reliance upon actual cost sheets a matter calling for considerable discrimination and critical examination. Yet some misleading figures have been widely published and the general tendency has undoubtedly been to understate costs. We know of one of the greatest shipping mines in the district that the pay roll alone, for one month, was over \$1 per ton, and with supplies, general expenses, repairs, timber, &c., the actual cost cannot have been less than \$1.50. The average for the mines, large and small, for the total costs, probably lies somewhere between \$1.25 and \$1.75, counting only a fair proportion of dead work. The timbering is becoming an item of more and more importance, being probably generally close upon 50 cents a ton. Then the rehandling of ore sent to the stock-piles during the winter months and taken up in the summer is an item which, according to circumstances, costs from 9 to 15 cents a ton on the ore so handled, exclusive of interest. Last year a company, the Cleveland Storage Company, advanced \$2 a ton on ore mined during the winter. The royalty is usually 50 cents, and may be said to range between 40 and 50 cents, going higher in some cases. The railroad freights to Ashland, inclusive of dock charges there, are 80 cents a ton. When the outlay is considered in the numerous side tracks and switches, or steep grades to the ore mines, and the capital invested in terminal facilities, this charge will not be regarded as excessive, and it may be questioned whether, except in times of possible brief wars, the rate can be lowered much below 70 cents a ton. Vessel freights have been unduly high during the current season, and while many large season contracts were made between \$1.65 and \$1.75, \$2 to \$2.25 have been freely paid, and as much as \$2.40 to \$2.50 have been demanded and obtained. Under ordinary conditions the rates may be expected to range between \$1.25 and \$1.75. Selling commissions are 10 cents a ton, and lake, port, dock charges, insurance, interest and bad debts may be placed at 25 to 30 cents a ton. We then have the following maximum and minimum:

Cost of Mining.....	\$1.25	\$1.75
Royalty.....	0.40	0.50
Rail freight.....	0.70	0.80
Vessel freights.....	1.25	1.75
Commission.....	0.10	0.10
Dock charges, insurance, shortage		
Interest and bad debts.....	0.5	0.80
Totals.....	\$3.95	\$5.20

Under the most favorable conditions the average Gogebic mines can therefore put down ore at Cleveland at about \$4. It is not likely that a single one of them is doing so now, because the lowest vessel freights this year have been \$1.65, or 40 cents more than the amount assumed, which more than counterbalances any possible cost lower than \$1.25. The probable cost laid down in Cleveland is this year close to \$5 to \$5.25 for the better situated mines. The sales for this season were made at the range of \$5.25 to \$6, which does not leave an extravagant margin. It must be considered, however, that this year vessel owners possessed an exceptional advantage, and that under ordinary circumstances their share of the profits would not be nearly so great.

The Van Depoele Electric Manufacturing Company, of Chicago, now have their electric railway system in practical and successful operation in the following cities: Appleton, Wis., Montgomery, Ala., Detroit and Port Huron, Mich., Windsor, Ont., Scranton, Pa., Binghamton, N. Y. and Lima, Ohio. The overhead wire system is the one in use. They are constructing electric street railways at Ansonia, Conn., St. Catharines, Ont. and Brooklyn, N. Y., and also have several other contracts which will be made public in a few days. The company have not gone out of the electric light business as reported. The city of Gainesville, Tex., is now lighted by electricity furnished by them, a 60-arc light plant having just been installed in that place.



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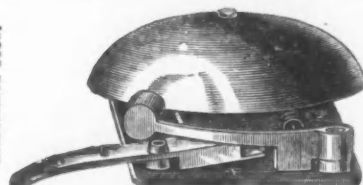
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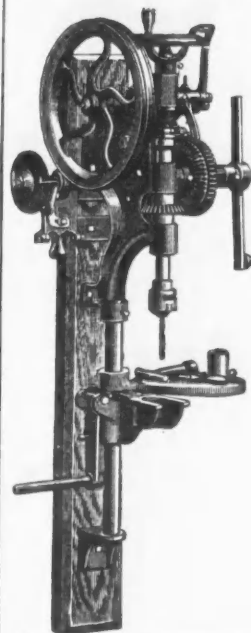
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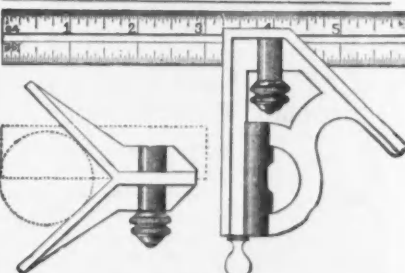
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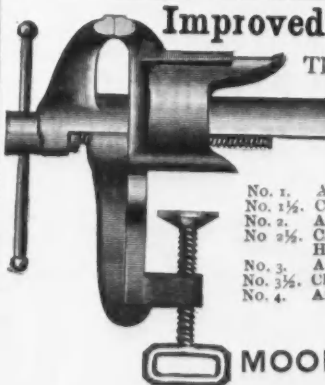
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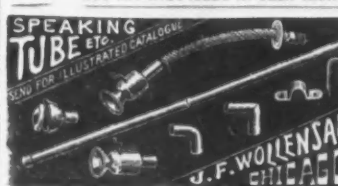
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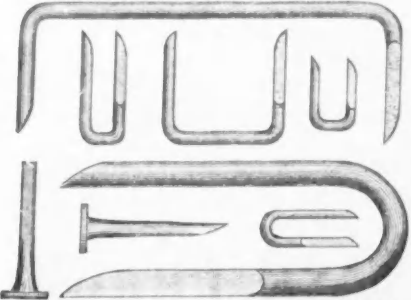
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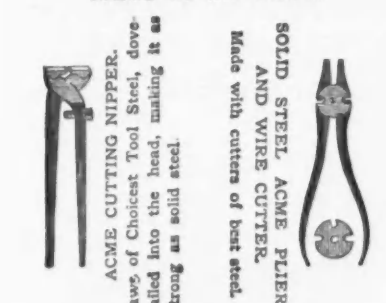
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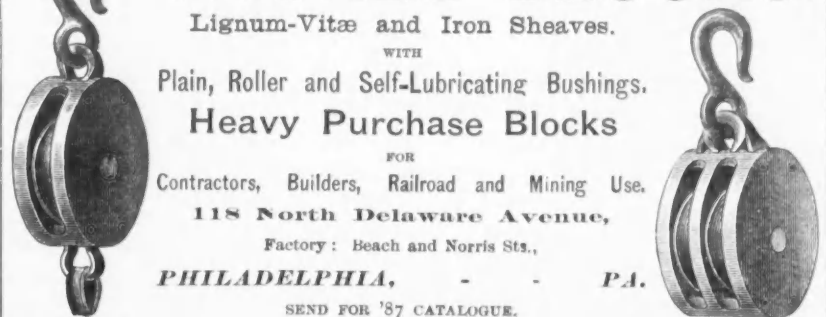
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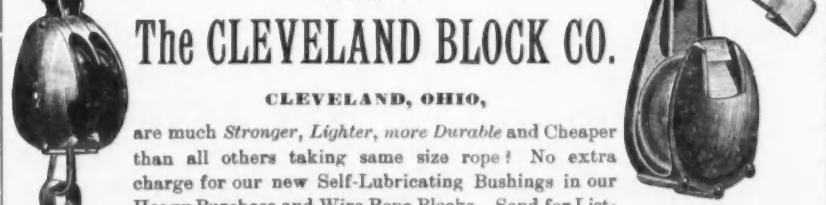
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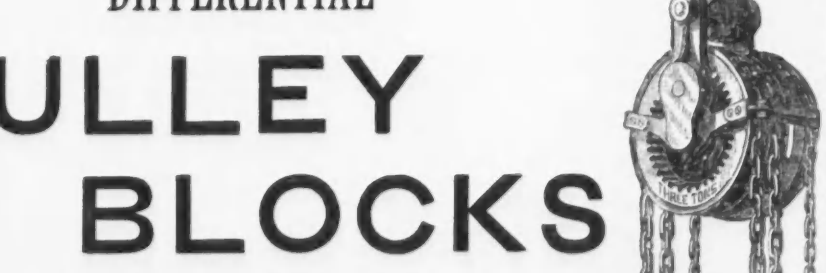


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## English Letter.

(From Our Regular Correspondent.)

LONDON, July 26, 1887.

THE SITUATION

in respect of the iron and steel trades has not undergone much alteration since my last report, but so much of change as there has been may be said to have been favorable. The continued heat and drought are interfering very considerably with the production in several departments of the trade, whilst the briskness of the steel works is affording a measure of relief to sundry branches of the iron trade. I gather, indeed, that almost or quite the whole of the Bessemer and Siemens steel works are busier than they have been for some years past. None of them are able to book additional orders for prompt deliveries of blooms, billets or rails, except at higher prices, whilst some of them positively decline to accept further contracts save at dearer quotations and with sundry saving clauses. This state of things is satisfactory as regards employment, and is held to prove that we are still able to meet the world in steel-making. On the score of profits, perhaps, the situation is not equally satisfactory, seeing that some of the work in hand was taken a long time ago at rates which do not leave much margin now that raw materials have stiffened and labor is getting rather better paid. So far as the American demand is in question there are diverse reports. In some quarters there are statements to the effect that your people want to buy large lots of new and old rails, blooms and billets, but will not pay the prices now asked by our manufacturers and merchants. An extensive interchange of cablegrams is in progress, and the vendors here assert that if your people really want to buy, they will have to pay the prices asked. It is suspected that many of the inquiries are simply feelers to keep touch of our absolute bottom figures, but whether that is so or not, holders on this side declare that whether you really want to buy or not, their quotations are real, and must stand as they are. As a sample of the divergent views prevailing on both sides of the Atlantic, I may say that a week or two since I saw sundry telegrams about lots of old D. H. rails. The vendors here asked 67/ or 68/; your people offered 64/ @ 65/. Several cables passed, neither side would budge, and I do not know which caved in, or whether the matter is still unsettled. Holders of old rails, however, say they mean to "sit on" their lots for full figures, and state that if you won't buy them they have a sure, even if a little slow, market in Italy for them sooner or later.

Speaking of steel reminds me that at the meeting of the Institution of Naval Architects to-morrow two interesting papers on basic steel will be read by Mr. Martell, chief surveyor of Lloyds, and Mr. W. H. White, of the Admiralty, respectively. The subject is one of peculiar interest to the North of England, and therefore appropriate to the Newcastle meeting of the Institution. You may remember the hubbub which arose about the failures of basic steel ship-plates, angles, &c., in 1885, and the consequent decision of Lloyd's Committee not to allow basic steel to be used for ships intended to be classified in their registry. Since that time no such steel has been used by the Admiralty passed on by the Lloyds, but innumerable experiments have been made at all the principal steel works, and the two papers now read give the results of these trials in detail. The tests of the basic plates, &c., made in and prior to 1885 show that the material was extremely irregular and mostly unreliable. It would break like glass with scarcely any bending, and pieces cut from the same plate would vary greatly in the tensile and elongation tests they stood. Since then special attention has been paid to the material, and although several firms have given up the production in despair, others have persevered and are now said to be able to turn out plates, angles, tees, &c., which are "reliable and trustworthy." The plates tested so far, however, are 1/2 lb. or under, of an inch thick only, and it is not yet made clear that thicker plates would pass equally severe tests, say 28 tons to the inch as a minimum, or the admiralty basis. Mr. Martell does not seem sure that the phosphoric pig of the Middlesboro' district will ever make reliable basic steel ship-plates, but both these authorities advise the manufacturers to persevere and kindly express the opinion that such perseverance will lead to ultimate success.

THE IRON MARKET

has exhibited a rather better tone during the week, although it would be rather difficult to state precisely to what extent. The feature regarded most favorably is that the downward tendency which was observable a month ago has not only been checked, but that, in spite of a general quietness, consumers are showing themselves more ready to buy somewhat ahead of present requirements. On Thursday warrants closed at 42/1 1/2 ton. In Cleveland the market is by no means unsatisfactory, notwithstanding that on Tuesday last few transactions were recorded. This, however, was as much due to the disinclination of makers to sell at rates offered by buyers as it was to the latter keeping back their orders. A number of small parcels of No. 3 G. M. B. are still held by merchants, and some of them have changed hands at 34/6. Makers continue to hold out for 35/. Compared with the corresponding week of last year the shipments from Middlesboro' have not been quite so good, but they have reached a fairly encouraging total. In the West Coast districts and in Staffordshire there is nothing fresh whatever to report. Prices lately ruling are well maintained, and transactions are upon the whole as satisfactory as can be expected from the general condition of trade. The Swedish iron market is quiet just now, this and the next two months being the dull period of the year for that trade. The outlook, however, is not quite so bad as it was a short time ago. The black and galvanized sheet departments have been well employed, and a good many lots have been sold at the advanced rates. The continuance of the hot weather has also operated in favor of the rise. In other manufactured branches, although there has

been no change, a steady business has been done. The heavy branches, as a whole, are the least well off for work, but some firms are busy and are well booked forward. Old scrap is practically unchanged, but old D. H. rails are reported to be from 2/ to 3/ 1/2 ton stiffer. Sellers are willing to do business at 70/ @ 71/, c.i.f. New York, but buyers are not disposed to give more than 69/. Mean-time holders are not at all anxious for sales. I quote f.o.b. only: Old D. H. rails, 60/; heavy wrought scrap, 50/ @ 52/6; old iron fish plates, 62/6 @ 67/6; and leaf spring steel, 52/6 @ 55/, all with an upward tendency. Freight for pig iron by ordinary steamer from Glasgow to New York remain steady at from 9/ @ 10/ 1/2 ton. Steel blooms for the United States are briskly inquired for for prompt delivery, but only one or two makers are able to fall in with this requirement. The business done has been on a basis of £3. 17/6 1/2 ton. Siemens-Martin billets, f.o.b. Glasgow, are now quoted at 97/6, and basic billets, f.o.b. the same port, at from 77/6 to 80/ 1/2 ton. Basic billets, f.o.b. Middlesboro', are also quoted at from 77/6 to 80/ 1/2 ton. For steel sleepers there are no fresh inquiries, but a large order for the Indian State Railway is expected to be given out in a day or two at the latest. General requirements continue to keep the works well employed. Steel rails are not in great request this week, although some business has been done. Among the transactions concluded is an order of 6000 tons taken by the Barrow Hematite Steel Company (Limited) for Canada at about £4. 4/ 1/2 ton, f.o.b. With regard to the 27,000 tons taken last week by the Barrow Steel Company, the price obtained was close upon £4. 4/ 1/2 ton, and the section is flanged, not double-headed.

SCOTCH PIG IRON

remains both easy and uneasy, and there has been only a small amount of business done since the fair holidays. There are now 82 furnaces—63 ordinary, 6 basic and 13 hematite—at work, as against 85 a year ago. In Connal's stores there are 901,777 tons—an addition last week of 3505 tons—as compared with 791,600 tons a year since. The shipments to date this year are 8903 tons in arrears, while the importations of Middlesboro' pig into Scotland are 15,162 tons ahead to date. Warrants are 42/7, whereas they were 38/10 last year, when the stocks were 100,000 tons smaller than they are at present.

TIN PLATES.

In London the market continues firm and most of the works are reported well booked for orders. Unless, however, the drought is speedily ended, a full supply of water obtainable and steel bars are more readily procurable, those who have placed orders will have to wait some time for delivery. A small business has been done in second-hand parcels at something below 13/6, but makers' prices are 13/6 @ 14/1, f.o.b., Liverpool. At Liverpool there has been no improvement in the state of the market, though there have been several attempts at business. The demand has been for Bessemer and Siemens steel plates, with coke tinning together with terne plates. For best cokes, charcoal and best charcoal tin plates, the demand is somewhat lighter, and so also is the demand for coke and steel tin wasters. Buyers have been offering 12/9 and 12/10 1/2, Welsh shipping ports for ordinary sorts of coke tin plates and Bessemer steel cokes, but these figures are as a rule refused, 13/ and even 13/6 being insisted upon. Specialties as to size are 13/6, 1C. Siemens steel plates with coke finish are 13/6 @ 13/9, 1C., f.o.b., Wales. The quotations for charcoal-tin plates are merely nominal at 14/9 @ 15/9, 1C., and 16/ @ 17/6, 1C., for best f.o.b., Liverpool. There have been a few more continental orders for charcoals lately. Coke tin and Bessemer steel wasters are now 12/6 @ 12/10 1/2. Terns are still firm at 25/ @ 26/.

THE GUN TRADE.

I take the following, as being likely to interest many of your readers, from the *Ironmonger* (London). In cheap hand-made guns adapted to the American market Mr. Bonehill admits that his trade for the moment has gone to the Belgians, but he is now busy on a new cheap gun in the Belgian style, but of superior workmanship, which he will be able to place in the market next season at something under Belgian prices. Mr. W. W. Greener makes a favorable report of the American market as regards his higher-class guns, both hammer and hammerless, which are selling well also in France, Italy, and other Continental markets. Ejector-guns are in growing request, but neither the home nor the Australian markets are showing much vitality at present. Enos James & Co., who are large makers for the American market, make a more favorable report of their business there than many of their competitors, while admitting that the American demand is not what it ought to be. Their stocks, however, which stood rather high last year, have been worked down now to a low point, and they are consequently busier in their workshops than is usual at this season. Both in the home and Australian markets their business is growing. Mr. Arbenz is also busy in "Gem" air-guns. T. Bland & Son describe the home trade as moderate for the season. Keepers' guns, with various types of ejector, are in fair request, but the principal engagements of the firm at present are for the American and Australian markets. Westley Richards & Co. are doing a quiet trade in the absence of any special demand for their renowned Cape rifle. Their Anson and Dealey hammerless gun, however, is still going well, both in this country and the United States.

Documents brought out during the Pacific Railroad Investigating Commission, at San Francisco, show the amount paid to the Pacific Mail from September, 1871, to March, 1886, by the Union Pacific Company to have been \$1,994,000; by the Central Pacific, \$2,030,000; by the Southern Pacific, beginning in 1883, \$356,000. These amounts had the effect to prevent competition with the transcontinental routes.

The cost of milling flour has been reduced at Minneapolis from \$6.35 in 1878 to \$4.50 in 1885, and at the present time the cost is still lower.



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If not, send and get prices.

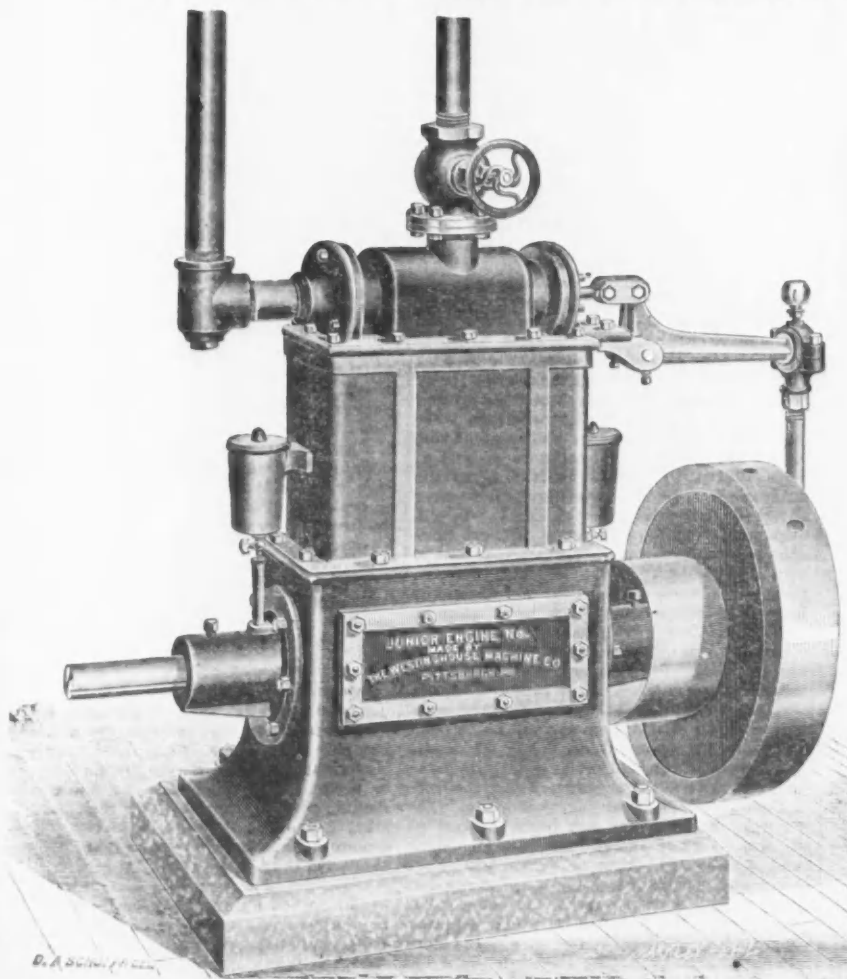


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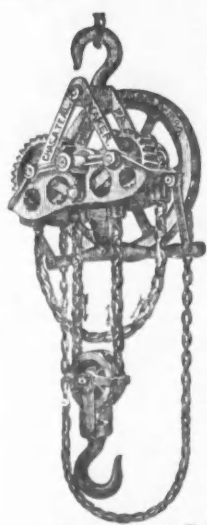
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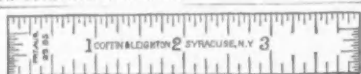
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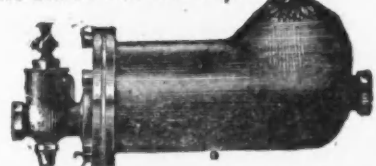
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### British Railroads Fifty Years Ago.

The *Railway News* improves the occasion of the jubilee to give some interesting figures and reminiscences of the status of railroads in the United Kingdom 50 years ago, giving a list of the mileage and capital of all the railroads which had been constructed in whole or in part at the time. The list, according to the *Railroad Gazette*, commences with the Surrey Iron Railway, nine miles long, with a capital of £60,000 in 1801. The Stockton and Darlington, 40 miles long, with a capital of £250,000 in 1821, is the twentieth on the list, and was preceded by 230 1/4 miles. When the Liverpool and Manchester was completed in 1826, with a capital of \$1,465,000 for its 30 1/4 miles, it made 485 1/4 miles open, and was the 35th road, and in 1837 there were 53 roads, with a capital of £9,336,000 and 792 1/4 miles. In 1886 there were 19,354 miles open, with a capital of £821,000,000. The capital per mile was £11,776 in 1837, against £42,368 in 1886. As there are 121,607.64 square miles in the United Kingdom, there was 1 mile of railroad to 153 square miles at the commencement of the Queen's reign, and 1 mile to about 6 1/2 square miles now. Twenty-three other roads, however, with an aggregate length of 1116 miles, were then either under construction or had obtained acts of incorporation.

Only one road had in 1837 entered London, and in that year a committee of the House of Commons were appointed to investigate whether the railroads could be regarded as safe modes of conveyance for Her Majesty's mails. They reported "that if the mails were sent by the railways, the post-office, with a view to their safe custody, should run its own engines and trains upon the railways, giving, as a matter of grace and favor, permission for a limited number of persons to travel in the trains, or in their own private carriages placed on the trucks (flat cars) of the railway companies." At this time about 3300 pounds of mail per day were being carried between Liverpool, Manchester and Birmingham at a yearly cost of £3000, which in the 50 years intervening has increased to £567,000 for over 2,000,000,000 pieces of mail matter. In those days the third-class passengers were carried in open "wagons" with wooden seats, and second-class carriages were open at the sides, having no glazing. The clear width of each compartment on some lines was only 5 feet 7 1/2 inches and the width 4 feet 4 1/2 inches, each seat being 15 inches in width. Stout passengers had some difficulty in squeezing through the doors, which were only 18 inches wide.

On each ticket was written the date, the amount of the fare and the time of the train, all of which were entered on the retained stub; but the roads were not governed by the time specified, if we can trust the following announcement: "Passengers intending to join the trains at any of the stopping places are desired to be in good time, as the train will leave each station as soon as ready, without reference to the time stated in the tables, the main object being to perform the whole journey as expeditiously as possible. Passengers will be booked only conditionally upon their being room on the arrival of the trains, and they will have the preference of seats in the order in which they are booked. No persons are booked after the arrival of the train. No smoking is allowed in the station houses, or in any of the coaches even with the consent of the passengers." Mr. Earl, a railroad director, thought that the trains might travel at the rate of 30 miles an hour in the daytime, and when all is clear, if the engines were sufficiently powerful. But it was held that it would not be safe for the post-office to have a night mail carrying passengers, in consequence of "the risk to the lives of the parties to be conveyed." As above intimated, most of the roads of 1837 have been absorbed in larger companies, and some of them were tramways that are now disused. There are no reliable data showing the dividends paid in 1837, but a list of the bonds and shares of 44 companies, of which 32 were in course of construction, shows that only five had paid dividends. The Grand Junction and Stockton and Darlington paid 10 per cent.; the Liverpool and Manchester, 9 per cent.; the Leicester and Swannington, 8 per cent. The Lancashire Railway and Dock, 7 1/2 per cent., and the London and Greenwich 3 per cent.

### The Apprentice Question.

The patriarchal system of binding a lad to a master, who in return for his services was not only to teach him a trade, but was to receive him into his family, has long since disappeared. The master mechanic does not now work with his men and cannot give much attention to his apprentices. There are also few respectable parents who would be willing to place their sons beyond their control, and there are few conscientious employers who would care to incur the responsibility implied in the old apprentice laws. The desire, however, on the part of the master mechanics to control in some way the labor of the lads they receive in their employ still remains. The difficulty of retaining a lad's services for a specified number of years lies in his unwillingness to work during the latter part of his term at low wages, in consideration of past benefits, or even to admit that he has received anything more than he has already paid for by his labor. The attempt to force the young mechanic to work for less than he can get in the open market usually results in his abrupt departure, and, perhaps, after repeated experience of this kind, in the master mechanic concluding that the young men of the present day are a shiftless lot.

The fault, however, would seem to be not so much with the young men as with a system which seeks to lump the clever with the dull and the handy with the awkward, to require all to work for four or five years, and then consider that they are skilled workmen. In such a system the more carefully a lad is trained in the workshop, or as it is now proposed, in both the workshop and the trade school, the greater the difficulty will be of retaining his services as he approaches manhood. If rules are devised to keep him, his young brain will find some means

to circumvent them. The interest the master mechanics are now taking in this apprentice question is a long step in the right direction. It concerns so deeply the welfare of many thousands of young men that it is important in any scheme to avoid as far as possible anything which may tend to discourage the masters or create a feeling of injustice among the apprentices. It might be possible to find some test of what constitutes a skilled workman besides the number of years passed in learning a trade. The main point would seem to be how much the apprentice knows when old enough to do a full day's work, not how long he was in acquiring his skill.

### Foreign Markets.

#### FRANCE.

PARIS, July 30, 1887.—*Metals*.—A moderate business has been done at a slight decline in Copper, an advance in Tin and Lead, and without change in Spelter. We quote at the close in francs, 100 kg.: Copper, 101 @ 107.50; Ingots and Slabs, 100; Best Selected, 112.50; Tin, Banca, 283; Biliton, 280; Straits 27.50; and English, 276. Lead, 30.50 @ 31.25, and Spelter, 38.25 @ 38.75. Iron.—At St. Didier orders have been dropping in more copiously during the week, but not to an extent to keep all works well booked, coke merchant being quoted 13.50 francs @ 100 kg., finished axes being maintained at 24. Castings are more active, one firm having received a large order. At Valenciennes, on the contrary, the situation has got to be worse, the consumptive demand for iron falling off perceptibly, so much so that the output will have to be curtailed, otherwise a severe decline will impend. Even now it is difficult to uphold the price of 12 francs for merchant.—*Montevidéu Interests Materials.*

#### BELGIUM.

BRUSSELS, July 30, 1887.—*Iron*.—The improved condition of the Charleroi market has not only been fully maintained during the week, but so far as finished iron is concerned has even made some further headway. Pig cannot fall to be favorably influenced thereby, and this at a time of the year when it is usually weak. We are allowed to augur well from this for the fall campaign. The Liege market remains firm. *Coal*.—A movement is on foot to get the duty on coal raised and freights lowered, so as to be able to make a stand against Westphalian coal, to compete with which has well nigh become impossible.—*Monteur Industriel.*

#### GERMANY.

HAMBURG, July 30, 1887.—*Iron*.—Our Dortmund correspondent reports as follows: "The feeling in Rhenish-Westphalia has become a little more buoyant during the week, the demand for Pig being on the increase. Of Spiegel, however, only the higher grades meet with a ready sale; the 10 to 12 1/4 qualities remain quiet, the export demand for them not having yet revived in a perceptible manner. Forge Pig is in better request since the finished iron syndicate was formed, the latter being decidedly more active since. In the Siegen district the previous decline in Forge Pig had perhaps been too rapid—at any rate, it is now selling with great ease in that quarter at an improvement. Foundry Pig also enjoys a brisker demand. Both Bessemer and Thomas have exhibited great steadiness. Spiegel, 10 to 12 1/4, 100 kg., may be quoted 30 @ 50.50 marks @ ton; Luxembourg Puddling Pig, 30 @ 34 francs. The demand for rolling mill products at current rates is fully up to the current output; some works are fully up to the current output, will be very operative to date from the 1st prox., and dealers have actively replenished supplies during the week in anticipation of a higher price level. The building season this summer is an exceptionally active one in Germany, benefiting Iron all the more, as it is more than ever super-saturating wood in the construction of buildings. This has caused an extra demand for beams, which have continued steadily trending upward. Boiler Sheets are in better request, and now 10 marks @ ton higher; this also relates to Thin Sheets similarly situated and advanced in price, with a further improvement evidently at hand since the rise in Forge Pig, all makers, moreover, being overworked with commands. In the Wire branch, on the other hand, values are barely sustained, but foundries and machine shops have done better, though prices outstanding might be more remunerative. Masters are more cheerful in Upper Silesia, both as regards Forge and Foundry Pig, since the two principal makers of Steel Rails and Billets are so very busy in executing orders, and the general situation goes on improving. An improvement in Forge Pig impends, orders being in excess of capacity for finished iron which continues trending upward. *Metals*.—Lead is without anything doing; Copper, steady; Tin, firm. We quote German Lead, 100 kg., 14.75 marks @ 100 kg.; Lake Copper, 50; Tin, 104 @ 108 and Spelter, spot, 14.80 @ 15.20; to arrive, 14 @ 14.50.—*Borsenhalle.*

#### HOLLAND.

ROTTERDAM, July 29, 1887.—*Iron*.—With a moderate trade doing, the market has been gradually trending upward. Banca spot and next being worth 65.50; Biliton spot, 62.50; and September 62.87 1/2 @ 50 kg.—*Koch & Vrobbom.*

#### SPAIN.

BILBAO, July 28, 1887.—*Iron Ore*.—Rains have hampered shipments during part of the week, but as a general thing the spell of dullness of the past two months is broken, quite a demand having sprung up for the United States, for which destination four large steamer cargoes have left this week and five of a like capacity are loading. Ore for immediate shipment is wanted by the cargo, while contracts for large amounts for future shipment are momentarily flagging. We quote Campaña 5.9 @ 7.2 and Rubios Superiores 5.9 @ 6.9. Shipments to date 2,480,200, against 1,899,190 last year. Pig Iron.—Has been brisk for export and moderately active for home use.—*Bilbao Martima y Comercial.*

#### CHILLI.

VALPARAISO, June 16, 1887.—*Copper*.—Sales have been restricted to 500 tons at \$15.35 @ \$16, since when the price is nominally \$15.35, in consequence of the rise in exchange, but holders decline submitting to this lower figure, which would equal 238. 1/8. Nitrate.—has been dull, only 50,000 quintals, 35 per cent., selling at \$2.70, and 34,000, 36 per cent., at \$2.50; the closing quotation is \$2.65 @ 1/2, equaling 17.50. Nearly the entire product of coming months has been disposed of beforehand. May shipments consisted of 31,500 tons to England, and 2800 to the United States. Loading, June 1: 30,000 and 5500 tons respectively. Charters so far in June, 2400 tons for Europe.

#### Shipments During the First Five Months.

	1887.	1886.	1885.
Quintals.	Quintals.	Quintals.	Quintals.
To the North of Europe.	3,217,225	1,969,661	2,660,050
To the Mediterranean.	123,421	86,812	26,582
To the United States on the Atlantic.	760,771	680,134	582,243
To the United States on the Pacific.	142,296	100,469	48,739

Total.....4,243,713 2,807,076 3,318,254

*Coal*.—Has remained firm; we quote Newcastle, West Harkly, 30; Orrol, 27.5; Australian, 23; June Newcastle, shipment 27-28. Exchange, 90 days, 243d.—*Weber & Co.*

The copper product of the great Calumet and Hecla mines, in Michigan, are threatened by a fire which is raging in the shafts, throwing more than 1000 men out of employment. The shafts are now closed and the steam turned on. A dispatch says: "The stamp mills and the new smelting works will have to be closed if the mine does not resume soon. The miners all are hopeful, although they know that this fire is far worse than that of three years ago. They have faith in the steam, but will not expect any change in the condition of things for several days. The South Hecla shafts 10, 11 and 12 are not connected, and will work day and night, and may be able to keep the stamp mills working half the time."



# The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, August 11, 1887.

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JAMES C. HAYLES and  
CHAS. KIRCHHOFF, Jr., - Editors.  
GEO. W. COPE, - - - Associate Editor, Chicago.  
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## America's Rank in the Production of Pig Iron.

Recent occurrences having drawn attention to the relations between the iron trade of this and other countries, we have examined with fresh interest the statistics of the production of pig iron in leading countries, and have noted some comparisons which are, to say the least, very striking, if not altogether novel. In the first place, taking the statistics for 1886 and ignoring the difference between the gross and the metric ton, we find that the United States could have produced in 30 weeks as much pig iron as Germany did in the whole year. In 13 weeks we could have produced as much as France did during the whole year; in six weeks as much as Belgium or Austria; in five weeks as much as Russia, and in four weeks as much as Sweden. The production of Great Britain exceeded that of the United States so slightly that it would have taken the latter only 11 weeks more than a year to have made as much as Great Britain did during the year. These comparisons show most vividly the important position this country now occupies among the iron-producing nations of the world. Illustrated graphically the comparison would be made substantially as follows, regarding the production of Sweden as the unit of measure:

The Rank of Pig Iron Producers in 1886.

Sweden.....	1
Russia.....	2
Belgium.....	3
Austria.....	4
France.....	5
Germany.....	6
United States.....	7
Great Britain.....	8

The production of the United States alone in 1886 was in excess of that of France, Germany and Austria combined, and but little under that of Russia, Germany, Russia and Sweden. At the rate of progress made on this side of the Atlantic in recent years America will shortly produce more pig iron in a given time than the whole Continent of Europe. Great Britain, it is true, has done this in past years, but it is not doing so now, and while that country is losing ground as an iron producer the United States is steadily advancing. This is shown most conclusively by going back a number of years, say to 1873, when a great boom culminated which had extended all over the

world. The production of the United States in 1873 was so far below that of Great Britain that it would have taken this country 133 weeks, or over two years and a half, to make as much pig iron as its overshadowing competitor did in one year. The production of Germany was so close to that of the United States that it would have required 41 weeks for this country to make as much as Germany did during the year. To produce as much as France turned out in a year would have required 28 weeks; Belgium, 13 weeks; Austria, 8 weeks; Russia, 7 weeks, and Sweden 6 weeks. Represented graphically, the position of the United States among the iron producing countries of the world, taking the production of Sweden as the unit, was substantially as follows in 1873, only 14 years ago:

The Rank of Pig Iron Producers in 1873.

Sweden.....	1
Russia.....	2
Belgium.....	3
Austria.....	4
France.....	5
Germany.....	6
United States.....	7
Great Britain.....	8

In 1873 the production of Germany and Belgium exceeded that of the United States, while the production of Great Britain was far in excess of that of the whole Continent of Europe. In that year Great Britain produced 86 per cent. as much pig iron as the others even leading iron countries, but in 1886 it produced only 53 per cent. In 1873 the United States produced 22 per cent. as much as the other seven countries, while in 1886 it produced over 43 per cent. America has thus advanced while Great Britain has retrograded.

The average weekly production of these several countries in 1873 and 1886 forms an interesting table, and it is here reproduced:

Average Weekly Production 1873 and 1886.

Countries.	1873.	1886.
Great Britain.....	126,278	132,128
United States.....	49,249	109,128
Germany.....	37,785	64,227
France.....	25,577	28,597
Belgium.....	12,549	14,122
Austria.....	8,165	13,406
Russia.....	6,808	10,000
Sweden.....	6,192	8,997

The progress here shown by the United States surpasses that made by any other country, and the increase in productive capacity which is now under way on this side of the Atlantic is far in excess of the efforts being made in the same line in any other part of the world. It may further be said with almost absolute certainty that during the first quarter of this year, before the coke strike had played its part in restricting the output, the weekly production of pig iron in the United States was abreast of that of Great Britain. To surpass the latter country would therefore seem to be the work of but a short time, and when Great Britain is led the whole world is left far in the rear.

## Cost of Service in Transportation.

We have urged that the principle of wholesale and retail dealings so universal in trade could not be applied to transportation without important modifications, one of which was the abolition of the sliding scale of freight rates according to tonnage. The principle of prices graded according to quantity in our daily business is founded upon reason. It is a necessity that goods at retail shall be sold at a higher price than at wholesale. The retailer is under many disadvantages; while his total sales may be but a fraction of the quantity sold by manufacturer or jobber, his expenses may be as great, thereby increasing the cost to him of each article very largely. The display of goods requiring space, the expense of the additional clerical force employed, the longer credit, the higher rent—these and similar reasons have always been recognized as compelling a price upon an article at retail, to the consumer higher than paid the wholesaler, or to the jobber higher than paid by him to the manufacturer. By unlimited competition the public are usually protected against any unwarranted increase in price of goods, beyond the extra cost of the service, plus a small profit. The matter easily regulates itself. Upon any line of railway we do not have the same great regulating force, but we must rely upon the judgment of railroad managers. These managers say that it costs more to carry small lots of freight, and that this extra cost properly is chargeable upon the traffic. Leaving out of view for the present the fact that railways are performing semi-public functions, and as agencies of the Government should treat all customers alike, as does the Post Office and Custom-House, let us inquire as to the details of this extra cost of service. While railway people are sure of the fact that small lots cost more to handle, they are unable to present any figures to sustain their views. In no other business in the world are such important matters decided upon mere guesswork or assumption. Differences are made in tariffs between different articles—we will say of iron—and between varying quantities of the same article, upon grounds that are purely arbitrary. In this way it is in the power of a classification committee, by a change of a few cents in the tariff, to shut out this or that place from competing for a special line of trade. Such changes should not be made except upon certainty of their justice, since trade should be left free to seek its natural channels without artificial helps or hindrances from classifications or tariffs.

The usual charge for lighterage in the harbor of New York is 60 cents per ton. This charge includes the different handlings, the expense for crews and towage to the ship

or dock, and also allows for the great delays to which such harbor lighters are necessarily subject. It represents the expense involved, which as to the work done is very nearly the same as that of two ordinary terminal stations. The average cost of receiving and delivering package freight at the different railroad piers and freight houses in New York is about 21 cents per ton. This includes only the station proper. In 1885 Mr. Chanute made a series of experiments which he tabulated thus, the road being the N. Y. C. and H. R. R., and the property moved from New York to Buffalo:

Class of goods.	Tons in car.	New York loads per ton.	Insurance, cents per ton.	Unloading at dest., cents per ton.	Total, cents per ton.
Boots and shoes.....	8½	40	3	18	61
Sugar and oils.....	10	25	3	12	40
Window glass.....	10	40	3	30	65
Hardware and nails.....	10	25	3	16	43

From the figures given above and without carrying the computation farther, for which, indeed, we have no exact statistics, we see that the average station expenses for staple goods are less than 60 cents per ton, or 3 cents per 100 pounds, counting in both terminals and including all the force employed. This, it will be noted, is the total cost for all kinds of freight in varying quantities. If the average expense per ton for all freight is as little as this, how small must be the saving in handling carloads over less quantities! To the above should fairly be added the train expenses in peddling freight at small stations along the road, but this is offset by the fact that cars come East loaded and must go back. The additional cost of a load is infinitely small.

While we await further light upon the subject from more accurate statistics, the compilation of which will soon be a railroad necessity, we are forced to the conclusion, from the facts as far as known, that the additional expense does not authorize an advance in freight rates for small lots over carloads of more than 1½ cents per hundred, or 5 per cent on the present carload rates on iron from New York to Chicago. The point is made that side tracks into factories should be considered. Side tracks belong either to the railroad company or to the factory—if to the former, they might be made the basis for charging more rather than less. Surely the building of additional facilities for any one firm should not in justice be accompanied by a concession also in rates. This would be discrimination indeed. If the side tracks belong to private parties it is presumed that they have been built because of their economy in handling the goods, and this of itself is the reason for their building and maintenance. This again can hardly be considered a good reason for a concession in freight rates not based upon some sound principle. It would seem that in considering the question of varying freight rates for varying quantities, the matter of side tracks might be left out of view.

## Ascertaining the Effect of the Interstate Commerce Law.

The Racine Business Men's Association, of Racine, Wis., have been impressed with the influence exerted upon their trade by the Interstate Commerce law, and to ascertain its extent they have instructed their Committee on Railways and Transportation to investigate the matter and report upon it. The committee, in order to avoid calling for any disclosure of private affairs, framed a series of questions, as follows, which have been sent to all the local manufacturers and merchants:

1. What proportion of your freight is received by rail and what by water?
2. What is the estimated average length of haul on receipts by rail?
3. Are your average rates of freight from Chicago greater than a year ago? How much?
4. Are your average rates of freight from New York and New England greater than a year ago? How much?
5. How and to what extent, generally speaking, has your business been affected by changes in rate of transportation?

The committee announced that all answers will be treated as confidential, and results only will be published. It will be interesting to learn the result of this investigation which is being pressed with some vigor by the live members of the association.

The list of questions published will serve as an excellent guide for business men of other localities to follow, who feel inclined to ascertain what the effect of the new law may be upon the trade of their particular section. They can be changed, of course, to suit the conditions governing transportation to and from inland towns depending entirely upon railroads. Other changes can also be made with regard to the distributing or producing center from which supplies or materials of manufacture are received.

Such an investigation, intelligently prosecuted and thoroughly covering the ground, should be a prolific fund of information of great value in determining the benefit or detriment, as the case may be, of the law regulating Interstate railroad transportation. It would furnish members of Congress with needed information of a practical nature upon a matter which is now very largely the subject of mere speculation. Four to six months' results of the actual trial of the law could be laid before Congress when the regular session opens in December. The subject seems to be an eminently proper one for the consideration of business men's association.

tions, chambers of commerce, boards of trade, or other local business organizations in need of a live topic in which to interest their members, and from which to deduce conclusions not only of local but of national interest. The investigation started at Racine should by no means end there.

## Our Trade With British India.

Between import and domestic export our trade with British India increased during the calendar year 1886 some 20 per cent. It may be profitable, therefore, to examine the latest commercial statistics published by the Indian Government covering the fiscal year ended March 31 last, as compared with the preceding twelvemonth. From the tables before us it appears that the import of merchandise into India amounted during the fiscal year 1886-87 to 586,960,000 rupees, against 518,110,000 in 1885-86, whereas the export of merchandise rose from 807,350,000 rupees in 1885-86 to 849,180,000 in 1886-87. The total foreign trade through the maritime ports thus constituted a total of 1,436,140,000 rupees, being 110,670,000 rupees greater than the previous year. The increase and decrease, in millions of rupees, was as follows:

	1886-87.	As compared with 1885-86.	1886-87.	As compared with 1885-86.
(1.) Live animals.....	2.61	+ 0.04	0.88	- 0.13
(2.) Food and beverages.....	68.35	+ 9.73	258.74	+ 11.62
(3.) Metals and metal goods:				
(a.) Hardware and cutlery.....	8.65	+ 0.89	0.06	- 0.01
(b.) Metals.....	46.89	+ 0.78	0.43	+ 0.04
(c.) Machinery.....	13.72	+ 3.80	.....	.....
(4.) Railroad material for private companies.....	14.35	+ 5.83	.....	.....
(5.) Chemicals, drugs, narcotics, dyes and tanning substances.....	9.59	+ 0.91	157.41	+ 3.25
(6.) Oils.....	14.08	+ 4.47	4.50	+ 0.63
(7.) Raw material and half manufactures.....	81.49	- 1.03	339.76	+ 21.35
(8.) Textile.....	322.14	+ 52.73	58.39	+ 6.62
(9.) Wearing apparel.....	10.96	+ 0.58	0.79	- 0.11
(10.) Other manufactures.....	44.39	+ 3.30	24.13	- 0.44
Total.....	586.96	.....	849.18	.....

The area under wheat culture in India is about 26,000,000 acres, producing on an average 7,135,000 tons, of which the following amounts were exported during the last four fiscal years:

To	1886-87.	1885-86.	1884-85.	1883-84.
Tons.	Tons.	Tons.	Tons.	
England.....	488,384	603,561	372,349	525,413
Belgium.....	130,159	133,079	85,844	139,678
France.....	140,184	107,362	165,748	169,595
Holland.....	10,347	4,396	4,627	9,637
Italy.....	260,615	60,913	35,045	22,276
Egypt.....	65,882	114,807	110,575	165,299
Others.....	32,569	29,107	17,536	25,636
Total.....	1,118,170	1,053,025	792,714	1,047,824

This year's area seeded with wheat has been 26,735,484 acres and the crop harvested, according to latest Government returns, 6,390,695 tons, the weather having been inopportune in a good many localities. The amount of wheat to be shipped depends on the price in Europe, the freight rates and exchange, provided there is no famine in India, for in the latter event little or nothing would be sent out of the country. Railroad extension has had a stimulating effect on wheat exportation, railroads now gradually penetrating into the heart of the wheat area. Thus last year 1720 km. of new lines went into operation, so that on December 31, 1886, there were 21,425 km. in operation, or 13,498 miles, against 12,376 miles on March 31, 1885, the new lines being 382 km. in Southern Mahratta, 194 branch lines of the North Western Railway, and 120 trunk line extension of the latter.

Consumption of India cotton has increased in England in million of pounds as under:

Average:	1886-87.	1885-86.	1884-85.	1883-84.
1886-87.....	56.5	1861-63.....	491.3	
1884-85.....	72.6	1866-70.....	576.5	
1886-87.....	56.7	1871-75.....	538.5	
1881-85.....	131.8	1876-80.....	407.4	
1886-87.....	317.9	1881-85.....	540.3	

The shipments of cotton piece goods from England to India, in millions of yards, were:

1878.....	1,395.4	1882.....	1,661.8
1879.....	1,327.6	1883.....	1,709.7
1880.....	1,813.4	1884.....	1,701.5
1881.....	1,719.0	1885.....	1,796.2

Of twist, in millions of pounds, the exports were:

1878.....	35.7	1882.....	45.0
1879.....	31.3	1883.....	45.3
1880.....	47.1	1884.....	49.1
1881.....	51.9	1885.....	44.5

Considering the rapid increase of cotton manufacturing in India, it must be confessed that both English piece goods and twist hold their ground remarkably well in India. The London *Figaro* nevertheless remarks: "That Bombay is actually competing with and beating Manchester in certain of the world's markets is a fact which can no longer be doubted. For some time the Bombay mill owners have been driving the products of Manchester looms from their own Presidency, but now it would seem they are pushing their trade in a similarly successful manner outside the boundaries of India. A clear proof of this is furnished by the report just made to the Foreign Office by our consul at Mozambique. In 1876, he asserts Bombay cotton fabrics were virtually unknown in that part of Africa. But last year the imports of these goods were valued at more than £20,000, while British imports for that period showed a serious falling off. It is, to be sure, all in the family, so to speak; but, nevertheless, the circumstance that Manchester is being actually beaten by a country which is not very long since was one of its best customers is too significant not to deserve special record."

Tea cultivation in India and the extraordinary success attending it is the latest and most striking advance there accomplished. We find in *Allen's Indian Mail* an article on

the "Growth of the Tea Industry in India," from which we reproduce the ensuing passage:

In 1870 the import into England was 20,500,000 pounds; in 1881 it was 45,750,000, and in 1886 it reached 75,500,000 pounds. The consumption for the corresponding years was 26,750,000 pounds, 48,750,000 pounds and 68,500,000 pounds, while during the current season, ending May 31, the import will reach 78,000,000 pounds and the consumption from 75,000,000 pounds to 76,000,000 pounds. The feature, however, which arrests attention is the proportion of Indian and Ceylon tea taken for home consumption, which during the past four months has risen to 50 per cent. of the whole, as against 30 per cent. in 1881 and 17 per cent. in 1876. Indian tea, as a matter of fact, is slowly, but surely, ousting its rival and obtaining command of the market. This has not been achieved without a lowering of the price to compete with the cheaper rates at which China tea sells; but the reduction has been slow, the average value of tea in London being about 1/14 per pound for the years 1882-85, while it is now estimated to be 1/10 per pound. This, however, has been anticipated, and has been met by a considerable reduction of the cost of production, effected, first, by consolidation of estates; second, by increased use of machinery; third, by more scientific methods of cultivation and manufacture, through which finer and larger yields are secured. India, indeed, having always beaten China in quality, now competes in price, most estates laying down their crops well under 1/10 per pound in London, and some under 8d. per pound, while it is admitted that a further reduction in cost is practicable.

A glance at the July London Indian indigo auction sales and statistics will show India's importance under this head:

Offered at Auction.	July, 1887.	July, 1886.	July, 1885.	July, 1884.	July, 1883.
Bengal and Tirhoot, chests.....	2,182	1,373	2,034	1,922	1,645
Oude and Plant Oude.....	148	294	787	2,450	1,214
Madras & Vellore.....	3,198	3,028	254	735	869
Kurpah.....	3,231	3,393	1,675	3,417	2,251
Oth. India sorts withdrawn and not catalog'd.....	421	1,424	81	775	104
Total.....	6,090	7,539	6,400	9,300	7,040
Stock, July 1.....	16,308	15,738	15,752	20,317	14,812
Deliveries, Jan. 1 to June 30.....	9,911	8,441	10,621	11,109	10,016
Bengal crop in fact, m. d. d. Madras shipments to Europe, Sept. 1 to June 30, chests.....	130,000	109,000	164,000	153,000	150,000
Total.....	10,300	11,737	5,784	14,391	10,970

The receipts of seeds during the first six months, at Bombay, were as under:

	1887.	1886.
Cwt.	Cwt.	
Linseed.....	1,853,387	3,974,767
Rapeseed.....	641,603	916,277
Sesamum seed.....	822,092	789,024
Total.....	3,317,552	4,680,968

During the fiscal year ended June 30, 1887, the United States imported 415,179 bushels of linseed from India, against 1,034,579 the previous fiscal year. Our net importation thence of jute was simultaneously 88,280 tons, against 82,867 in 1885-86. Our net import of indigo, nearly all from India, was 3,449,144 pounds, against 2,691,167 the preceding twelve months.

Owing to the silk worm disease sericulture is the only industry which has been strikingly on the decline in India for a couple of years past. Export of raw silk from India through the port of Calcutta was, in 1884, 861,000 kg.; in 1885, 760,000, and in 1886, 781,000 kg. Energetic steps have been taken to procure silk eggs from abroad not affected by disease. A few years will not unlikely suffice to remedy the existing evil, the Government stirring in the matter. The magnitude of the American trade is shown in the following figures:

Calendar Year.	Imports.	Domestic exports.
1886.....	\$18,762,719	\$4,839,233
1885.....	16,133,220	3,657,017

Our domestic export increases chiefly in the article refined petroleum:

Year	Petroleum, gallons.	Export to India.
1881	6,698,770	\$28,362
1882	2,747,500	2,083,987
1883	19,041,410	2,017,511
1884	32,487,460	3,344,918
1885	37,839,930	3,562,733
1886	42,473,477	3,869,365
Total	163,640,547	\$16,596,476



was quoted with much show of conclusive reasoning. These tables invariably place Great Britain at the head of the list, far in advance of all other countries, when a study of the facts will quickly show that they are grossly incorrect. It is a very difficult matter to compute what the consumption per capita really is. Roughly, it may be taken as the production of pig iron, allowing for accumulation or falling off in stocks, adding imports, and deducting therefrom the exports of iron and steel of all kinds for which pig iron is the only raw material, with the exception of scrap and old rails. It is true that the figure remaining is excessive, because no allowance is made for the waste in the manufacture of the goods which are exported. On the other hand, one factor tending to make it larger—the old material alluded to—is omitted. Assuming the population of Great Britain to be 36,500,000, we reach a consumption per capita of 223 pounds per annum. For the United States we have added to the apparent consumption of pig iron during 1886 the imports of foreign iron and steel during the same year, which it will be noted again neglects to make allowance for the use of old material. Assuming that our population has reached 60,000,000 souls, we reach a consumption per capita of 255 pounds per annum, a figure which should pretty effectually dispose of the time-honored fiction that Great Britain, and not the United States, is pre eminent as a consumer of iron.

So much difficulty has been experienced this season in securing vessel room for the carriage of Lake Superior ore that the large mining companies intend to buy or build vessels in time for next year's business, and thus secure their independence of vesselmen. The Republic Iron Company have owned a fleet of vessels for several years, but until now has it been deemed wise to imitate their example. It is assumed by some that this move on the part of the large companies will place the owners of small mines in an uncomfortable position, because they will be unable to compete with concerns which control their own transportation lines. This view does not seem reasonable, as the more vessels the large mining companies build the more competition must take place among vesselmen for the business of the small mines, with correspondingly reduced freight rates. The vessel owners seem to be the ones most likely to suffer in the expansion of carrying facilities.

#### The Condition of the Blast Furnaces, August 1.

During the month of July quite a number of changes have taken place in the direction of reduced current output among those using anthracite as a fuel, while there has been a resumption of work among the coke stacks, following the settlement of the strike. Quite a number of the latter had not begun blowing on the 1st inst., which have since entered the ranks of producers, so that the current month will probably witness a gradual increase in the make. With the anthracite furnaces the decline in the make is nearly 3000 tons a week, and we entered August with the lowest current output since the opening of the year. In detail the status of the anthracite furnaces is as follows:

Anthracite Furnaces in Blast August 1.

Location of furnaces.	Total number of stacks.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	29	14	3,609	15	4,320
New Jersey.....	15	8	2,311	7	2,723
Pennsylvania.....	9	2	137	7	105
Lehigh Valley.....	48	41	11,817	7	2,115
Schuylkill Valley.....	40	30	7,300	10	1,400
L. Susquehanna Val.....	23	15	4,135	8	1,430
Lebanon Valley.....	1	1	285	0	0
U. Susquehanna Val.....	18	10	2,780	8	750
Maryland.....	4	1	229	3	455
Total.....	197	129	37,390	68	15,058

Location of furnaces.	Furnaces in blast.	Capacity per week.
August 1.....	129	37,390
July 1.....	138	40,742
June 1.....	138	44,188
May 1.....	137	45,932
April 1.....	139	48,585
March 1.....	141	48,734
February 1.....	137	41,951
January 1.....	139	40,735
December 1.....	139	36,320
November 1.....	116	36,348
October 1.....	114	35,819
September 1.....	112	33,207
August 1.....	107	36,762
July 1.....	121	38,239
June 1.....	119	36,944

In New York both of the Burden furnaces and both of the Elmira stacks are out of blast, and Kirkland has not yet resumed. In New Jersey only one of the Andover furnaces is running. The Chester has gone out to put in a new boiler, and Port Oram blew out on the 28th ult. With Musconetcong still idle this month, this reduces the make considerably. The Passaic Spiegel furnace went out on the 31st ult. In the Lehigh Valley the only noteworthy change is the blowing in of the sixth Thomas furnace, leaving the Lucy as the only one of the 12 furnaces of the Thomas Iron Company which is temporarily out of blast. It should be stated that here, as in all the other anthracite districts, the reports show a reduction of the July make below the average, a natural result of the excessively hot weather of that month. The Lehigh Spiegel furnace is not now running. In the Schuylkill Valley no

changes have taken place, although it is reported that the Minersville furnace has been banked lately on account of some complications with the Minersville Water Company in regard to water supply. In the Lower Susquehanna district one of the Chickies furnaces is idle, and Lochiel is out. The only furnace of the Pennsylvania Steel Company not now running is ready to go in. In the Lebanon Valley there have been no changes, all but two of the furnaces of that group being producers. In the Upper Susquehanna region there have been no notable changes. In Maryland only one of the Ashland furnaces is producing.

Bituminous and Coke Furnaces in Blast, August 1.

Location of furnaces.	Total number of furnaces.	Number in blast.	Capacity per week.	Number out of blast.	Capacity per week.
New York.....	3	1	656	2	1,000
Pennsylvania.....	19	15	15,730	4	2,850
Shenango Valley.....	1	1	450	0	0
Shenango Valley.....	19	17	3,628	2	6,155
Shenango Valley.....	12	13	5,664	0	2,310
Shenango Valley.....	5	2	411	3	1,010
Shenango Valley.....	3	1	875	2	842
Shenango Valley.....	2	1	250	1	90
Shenango Valley.....	10	2	2,880	8	1,160
Shenango Valley.....	6	2	810	4	1,335
Shenango Valley.....	3	2	580	1	280
Shenango Valley.....	18	7	5,040	11	4,515
Shenango Valley.....	13	9	2,707	4	900
Shenango Valley.....	15	6	2,933	9	6,510
Shenango Valley.....	16	9	8,560	7	5,080
Shenango Valley.....	3	2	840	6	2,530
Shenango Valley.....	3	3	1,057	0	175
Shenango Valley.....	1	0	0	1	245
Shenango Valley.....	12	8	3,230	4	1,205
Shenango Valley.....	2	7	2,610	2	800
Shenango Valley.....	1	1	405	0	0
Total.....	209	118	62,091	90	41,345

As compared with previous months these figures stand:

	No. of furnaces.	Capacity per week.
August 1.....	118	62,091
July 1.....	94	47,319
June 1.....	98	44,865
May 1.....	148	83,509
April 1.....	148	81,740
March 1.....	146	79,082
February 1.....	145	79,257
January 1.....	137	73,422
December 1.....	139	73,795
November 1.....	140	73,013
October 1.....	136	70,882
September 1.....	135	69,206
August 1.....	133	68,832
July 1.....	132	71,316
June 1.....	129	69,750
May 1.....	129	67,888

In New York one of the Troy furnaces is banked, on account of a difficulty with a part of the pumping plant. In the Pittsburgh district the resumption of work since the close of the coke trouble has been rapid. Carrie Furnace went in on the 27th ult., Soho began work on the 10th ult., and Edgar Thomson, Spiegel, on the 7th. Both of the Isabella furnaces were running on the 1st, one of them on mill iron and the other on Bessemer pig. All of the Edgar Thomson furnaces except D are working, and that stack, which has been repaired and relined, will resume on the 15th. Since the 1st of the month Clinton and Edith have blown in so that the current capacity is greater by over 1000 tons a week than that indicated in our table. One of the Schoenberger furnaces resumed toward the end of July, and the other, which has not been in operation for three or four years, is being relined and repaired, and will begin work as soon as possible. The indications are that by the 1st of October every furnace in the Pittsburgh district, 20 in all, will be in active operation. In the Shenango Valley the Claire, Douglas, Etna, Sharon, Spearman and two Stewart were running on the 1st, the Douglas having started on the 28th. Others have resumed, while some of the stacks are still banked. In the Juniata and Conemaugh valleys one of the Rockhill furnaces blew out on the 15th ult. One of the Blair furnaces of the Cambria Iron Company is being relined. On the other hand, the four furnaces of the same company, which were banked during July, are again in operation.

In Virginia, Low Moor entered August as a producer, and Crozer has again made a larger product. Still, the July make was relatively small, not being more than 7044 tons. In West Virginia, Riverside, banked on account of the coke strike, is again running. Belmont is expected to begin producing on the 15th of this month, while the Top Mill Furnace was still banked in the beginning of this month.

In the Mahoning Valley Anna Furnace started on the 1st; Grace produced only during the last week of July; Mary resumed on the 28th. One of the Hubbard stacks was to be started on the 4th and the second to follow on the 10th, coke coming forward slowly. In the Hanging Rock region the Wellston is again at work. In the Hocking Valley Akron worked part of July and Bessie blew in late in that month. Among the furnaces of Central and Northern Ohio resumption seems to progress more slowly. Bemwood, one of the Cherry Valley, the four Cleveland and the Steubenville were still inactive on the 1st of the month. Emma was about to blow in. In Illinois the South Chicago is again closely approaching its large output of former months; the two Chicago furnaces are blowing and the four Union stacks were the only ones reported to be banked on the 1st. The July product of the State was 37,527 gross tons. In Missouri only one of the Missouri and one of the three Western Steel Company's stacks were blowing during July; since then the Jupiter, leased by the latter company, after being re-

modeled, has gone into blast. In Indiana Vigo Furnace has stopped.

In the South, the Bibb Furnace, of Alabama, which has been idle for a long time, has probably blown in at this date. The product of the Eureka was below the average because repairs had to be made in connection with the stove. The Woodward made a good month's record. In Tennessee the output has been, generally speaking, light. Citico lost 10 days through repairs, the Rockwood furnaces did not come up to their usual average and one of the South Pittsburgh stacks went out of blast. In Georgia the Cherokee was banked for nine days to make repairs.

The position of the charcoal furnaces was as follows:

Charcoal Furnaces in Blast July 1, 1887.

Location of furnaces.	Total number of stacks.	Number reported in blast.	Capacity per week.	Number reported out of blast.	Capacity per week.
New England.....	14	3	597	11	460
New York.....	23	5	638	18	585
Pennsylvania.....	13	3	430	10	383
Maryland.....	24	3	407	21	618
Virginia.....	24	3	510	21	682
West Virginia.....	3	0	0	3	165
Ohio.....	17	9	835	8	375
Kentucky.....	3	1	107	2	214
North Carolina.....	2	1	92	1	214
Tennessee.....	9	4	784	5	555
Georgia.....	2	0	0	2	162
Alabama.....	10	8	1,750	2	162
Michigan.....	25	14	3,873	11	2,243
Minnesota.....	1	0	0	1	220
Missouri.....	4	2	685	2	398
Wisconsin.....	9	3	815	6	580
Texas.....	2	0	0	2	330
California.....	1	0	0	1	245
Washington Terr.....	1	0	0	1	175
Oregon.....	1	0	0	1	100
Total, July 1.....	174	67	11,333	107	8,394

In New England Kent Furnace is again running, and in Pennsylvania Pine Grove has resumed after a brief period of idleness. In Ohio no special changes have taken place. In Michigan we estimate the July product from the returns of 12 out of 14 furnaces at 16,340 gross tons. In Tennessee four furnaces—the Aetna, Cumberland, La Grange and Warner—report an aggregate product of 3350 tons, and the Speedwell is to be added to this list of producers this month. In Alabama the output of the Woodstock furnace was reduced in July through the stoppage of both of them for a week for repairs.

The figures for our imports of iron and steel continue to run up steadily. The latest returns cover the first half of the calendar year and the fiscal year ending June 30. Below will be found the quantities in gross tons:

	First half calendar years.	Fiscal years.
1886, 1887.....	497,385	609,828
1887, 1888.....	192,114	239,665
1888, 1889.....	41,583	241,800
Scrap iron.....	3,325	19,009
Cast iron.....	11,996	15,482
Steel rails.....	10,221	45,696
Steel hoops.....	2,749	5,029
Sheets and plates.....	1,351	12,757
Steel ingots, blooms, billets, slabs, bars.....	45,514	172,676
Steel, plate and saggers iron.....	2,153	2,709
Tin plates.....	148,316	145,080
Wire rods.....	82,817	85,417
Anvils.....	554	762
Chains.....	272	391

These figures prove how enormous have been our imports, showing no abatement as yet. There is nothing in this month's returns which calls for any comments in addition to those repeatedly made in the past in going over similar statements.

The question whether or not one man is to be allowed to hold two jobs in the Western iron mills continues to agitate the trade in that section, and, while some of the manufacturers who have been afflicted with the strike from that cause have again gone to work, others are still holding out. It has been the custom in many mills to employ and pay one head roller to take charge of several trains on both shifts, the object being to hold one man responsible for the work performed by the machinery. This class of employees have always been very well paid, and it is asserted by the men that they in reality pay back to the manufacturers a part of their wages. The manufacturers deny this statement, and urge that the system secures to them the greater certainty in procuring the best results, and they insist that the strike inaugurated to force them to distribute the work among a number of men is virtually a breach of the contract which the association entered into when it signed the scale. This bringing up of after issues subsequent to the formulation of a scale containing many clauses not directly touching on wages, is a course of which the officers of the Amalgamated Association have little reason to be proud. It is in direct opposition to the principle once followed by that body for making a final and conclusive settlement once a year, without allowing new points to disturb the harmony after the one struggle early in the summer. There has been but one exception to this in recent years, and a departure from such a policy must naturally react unfavorably upon the trade, so far as future conferences are concerned.

Mr. Powderly has issued another of his manifestoes, directed this time against the speculators in produce, his assertions being somewhat wild and the remedies proposed unusually vague. He asks whether the time has not arrived to appoint a commission

to inquire into this "refined method of robbing the people," so that a law can be passed to punish those who gamble in food while others starve for want of it. He holds that a counter movement should be organized in the form of a farmers' exchange and a laborers' exchange. He neglects entirely to specify, even to the most elementary points, how such organizations should be formed and what their province, their source of power and their methods of wielding it should be.

#### Freight Rates on Southern Pig Iron.

The following table, specially compiled for *The Iron Age*, gives the railroad freight on pig iron from the leading producing districts to Northern points, per ton of 2265 pounds:

Rates on Pig Iron (Carloads—17 Tons), Taking Effect August 1, 1887.

Localities to which shipments are made.	From Dayton and Rockwood, Tenn.	From Chattanooga, Tenn.	From Atlanta, Birmingham, Gadsden, Wheeling, Ala., Rising Fawn, Ga.
Adrian, Mich.	\$4.45	\$4.05	\$5.15
Akron, Ohio.	3.90	4.10	4.60
Albion, Mich.	4.45	4.05	5.15
Alcon, Mich.	4.05	4.85	5.35
Allegheny, Pa.	4.55	4.75	5.25
(B) Alton, Ill.	3.91	4.11	4.36
Anderson, Ind.	3.95	4.15	4.65
Argonia, Ark.	5.10	4.90	4.90
Ashland Ky.	3.49	3.29	3.72
Ashtabula Ohio.	4.35	4.55	5.05
Ashland Ohio.	6.30	6.05	6.80
Athens, Ohio.	4.00	4.30	4.70
Atlanta, Ill.	5.35	5.35	5.80
Aurora, Ill.	5.02	5.22	5.47
Aurora, Ind.	2.65	2.85	3.35
Batavia, Ill.	5.15	5.35	5.60
Battle Creek, Mich.	4.55	4.75	5.25
Bay City, Mich.	4.90	5.10	5.60
Beaver Falls, Pa.	4.65	4.85	5.35
Bellaire, Ohio.	4.55	4.75	5.25
Bellefontaine, Ohio.	3.85	4.05	4.55
Bellefonte, Ill.	3.40	3.60	4.10
Beloit, Wis.	5.42	5.62	5.87
Bloomington, Ill.	4.65	4.85	5.35
Brazill, Ind.	3.85	4.05	4.30
Bridgeton, Ohio.	4.55	4.75	5.25
Burlington, Iowa.	5.17	5.37	5.87
Cadillac, Mich.	5.65	5.85	6.35
Cambridge City, Ind.	3.89	4.00	4.50
Canal Dover, Ohio.	4.25	4.45	4.95
Canion, Ind.	5.25	5.45	5.95
Canton, Ohio.	4.25	4.45	4.95
Carpentersville, Ill.	5.28	5.48	5.73
Cedar Falls, Iowa.	6.63	6.83	7.08



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## MECHANICAL.

## The Washburn Rotary Engine.

We show on this page engravings of a rotary engine, which appears to have come into some practical use and to have given good results both for stationary and boating purposes. It is known as the Washburn Rotary Engine, and is made by the Washburn Engine Company, of Medina, Ohio. A fair idea of its design and manner of working will be gained from Figs. 3 and 4, representing respectively longitudinal and transverse sections of the cylinder. In these, A represents the steam cylinder within which works the piston-wheel C, mounted on a shaft inside of and between the pistons the exhaust occurs at this part of the advanced piston stroke through the port J.

It will be seen more clearly from diagram Fig. 5 that by means of the larger bore, and on the side opposite the induction port, ample room is had for the expansion of the steam, while by means of the smaller bore that one on the side next the induction port extending outside the line of the larger bore, the rear piston adjacent the induction port and for some distance above is kept largely within the piston-wheel, giving the opposite piston a large preponderance of exposed area. We have, then, a rotary engine using steam expansively, the rear piston acting as a cut-off. As the rear piston takes steam and travels some distance before the for-

## Man-Hole Plates for Boilers.

Any sort of casting, says the *Locomotive*, seems to be considered good enough for a man-hole plate, and some of the specimens we meet are pretty tough-looking ones. It is but a short time since we were called to examine what was thought to be a crack in one of the ribs of a man-hole plate. The defect proved not to be a crack, but a flaw in the iron. When new it was filled with sand, and had quite a smooth appearance, but the heat and the action of the steam had cleaned out the sand and left quite an ugly looking place in the casting. Further investigation showed that the opposite or outer surface of the plate had a honey-combed appearance over nearly its whole extent. A very little picking with the

was shown in the case there under consideration, that with the same spacing the nutted stay was decidedly the superior, with the plates and stays cold. Where an accident occurs, however, from overheating, the nutted stay either (a) draws through the plate or nut, or (b) draws the nut through the plate, or, finally (c), the shank of the stay may part either in the hole or on the water side of the crown plate. It is in the last case (c) where the danger of the nutted or solid headed stay lies. If the stay is screwed into the crown plate, the thread will prevent the bit of stay attached to the plate from being blown into the fire, and the hole will remain plugged. Stay after stay may part in this way without giving vent to the steam, and a disastrous explosion may result from rupture of the unsupported plate. This action cannot, of course, take place if the stay is not screwed into the plate. A recent case we have had illustrates this. A boiler of the locomotive type, stayed with girder stays on the fire-box crown, was allowed to get short of water. The bolts through the girder and crown plate were nutted on the inside of the fire-box, but were not screwed into the plate. One bolt parted in the shank, and the bolt end, with the nut, dropped into the fire, acting like a fusible plug. Neither the plate nor any of the other stays were ruptured, no one was hurt, and the accident cost us only \$35 for the repair of the fire-box. Had the stays been screwed into the plate, and furnished with nuts or solid heads inside the fire-box, it is not likely we should have got off so easily. Putting it from an insurance point of view, I should be inclined to take a higher risk for the same premium on a boiler with riveted crown stays than I should on one fitted with nutted or solid-headed stays if these latter were screwed into the plate, calculating that there would be the least chance of our having to pay the full amount insured with the riveted stay. As may be gathered from the particulars given above, however, there are other modes of attachment of stays in use which would appear to be preferable to either of the systems under consideration.

## New Hoisting Engine.

The Carthage Foundry and Machine Company, of Carthage, Mo., are building at their shops a new form of hoist, designed specially with a view to simplicity and compactness. It has no gearing whatever. The operating lever is attached to an eccentric, by means of which a friction pulley may be thrown in contact with a small paper driving pulley, thus giving motion to the drum. The tub is lowered by means of a foot lever, and a balance wheel is arranged within easy reach of the attendant at the main lever, so that he can pull the engine off the center should it stop there. The engine is rated at 5 horse-power. The outfit, moreover, embraces a vertical boiler, the whole forming a cheap and convenient rig. It hoists rapidly and noiselessly, and has, we understand, given general satisfaction where used.

The following prominent American firms have exhibits at the American exhibition now open in London: A. Whitney & Sons, Philadelphia, chilled car-wheels; Bush Interlocking Bolt Company, Philadelphia, interlocking bolts for railway track, &c.; the Indurated Fibre Company, New York, buckets, &c., made from wood fiber; Kilbourne & Jacobs Mfg. Company, Columbus, Ohio, wheeled scrapers; Hall Duplex Steam Pump Company, New York; Underground Electric Cable Company, Pittsburgh, Pa.; Waring cables; the United States Metallic Company, Philadelphia, piston and valve stem packing. There are in all about 500 exhibitors.

The July product of the Lake Superior copper mines was: Calumet and Hecla, 265 1/2 tons; Quincy, 250 tons; Franklin, 202 tons; Atlantic, 193 tons; Huron, 31 1/2 tons. The Huron resumed stamping operations after the destruction of the mill by fire on July 18, and has at present one head in operation. There is no late or satisfactory news from the fire in the Calumet and Hecla mine. All the shafts are tightly closed and water and steam are being poured into the mine, but with what effect cannot be told.

## Wood Seat Adzer.

The Rollstone Machine Company, of Fitchburg, Mass., are introducing an im-



Wood Seat Adzer, Made by the Rollstone Machine Co., Fitchburg, Mass.

## Riveted vs. Nutted Boiler Stays.

Referring to the recent torpedo-boat boiler accidents in England, we find some interesting notes written by Mr. Niel McDougall, late British Admiralty inspecting officer, and now chief engineer of one of the English boiler insurance companies. Speaking of the comparative values of the stays used in the Thornycroft and in the Yarrow boilers, those in the former being riveted and those in the latter nutted, he says:

The difference in the holding power of riveted and nutted stays when spaced widely apart was investigated during the inquiry into the Thunderer explosion. It

## The Gun Trials on Board the Atlanta.

The report of the board of naval officers appointed to examine the Atlanta, her guns, carriages, fittings, &c., and to ascertain the damage sustained during the recent much-talked-of target practice was received by the Secretary of the Navy last week.

The board state that the ship was taken to sea on the morning of July 27, and her guns were fired. "No deficiencies," the report says, "were noted in the guns themselves other than a slight sticking of the breech plug in 6 inch breech-loading rifle No. 5 (this disappeared during the firing); some difficulty in the management of the lock of 6 inch breech-loading rifle No. 4, caused by slight upsetting of the firing pin, and the bending of the extractor in 6-pounder R. F. No. 5. The recoil and counter recoil of the 3 and 6 inch guns were easy and satisfactory, except at the second fire of the 3-inch breech-loading rifle No. 1, when the gun remained in. (The gun was readily run out with a tackle). The action of the carriage of 8-inch breech-loading rifle No. 1 at the first fire was due to want of strength in the clips and clip circles, and at the second fire to want of sufficient bearing and securing of the deck socket. It is believed that had the deck socket held the carriage would not have been disabled by the giving away of the clips. The training gear, steam and hand, was uninjured; the gun was readily trained when run out to place. The action of the after 6-inch shifting gun No. 4 was satisfactory, notwithstanding that the front clips had a play of 1/4 inch. The action of the broadside carriages of 6 inch guns No. 5 and 18 was satisfactory except the breaking of clips, the starting of the copper rivets in the clip circles and the wood screws in the training circles. It is believed from the action of the carriage of 6-inch breech-loading rifle No. 5 when the clips were removed that the carriage can be safely used without clips. The clips, however, give additional security and steadiness to the carriage and assist the pivot and socket in bearing the shock of the discharge. The firing of the 6-pounder R. F. guns developed a weakness in one leg of the cage mount of No. 4, due to imperfect workmanship, and also the necessity of locking nuts in the bolts that secure the mounts to the ports.

The lower mounts of the 3-pounder R. F. guns are unsatisfactory. The Y cannot be moved with facility, the line of sight of the gun is obstructed at ranges beyond 1600 yards and the guns cannot be safely used as now fitted. For this reason 3 pounder R. F. No. 3 was not fired. The tripod mounts of the 1-pounder R. F. guns need stronger holding-down arrangements. The tower mounts of the 47 M. M. R. C. are like those of the 3-pounder R. F. guns and have the same defects. The shelf and the Trolley mounts of the 37 M. M. in the tops are satisfactory. Careful observation of the effect of the firing upon the hull of the vessel failed to develop any damage other than the breaking of the cast-steel port-sills and the starting of some light woodwork. The shock of discharge was slight in the berth deck, and observers there were unable to observe which 6 inch gun had been fired. The deck, hull and fittings, with the exception of the port sills, hinges to superstructure doors and vegetable lockers and some of the light woodwork have every appearance of strength and ability to endure the strain of continuous firing of the guns. The blast of the forward 8-inch gun, when fired abaft the starboard beam, will not permit the crews of the starboard 3 pounder R. F. and 1-pounder R. F. to remain at their guns. When the after 8-inch gun is fired forward of the port beam the crews of the after 47 M. M. R. C. and of the port after 1-pounder R. F. cannon remain at their guns. When the forward 6-inch shifting gun is fired on the port bow or directly ahead, the crew of the forward 8-inch gun cannot remain at their places. When the after 6-inch shifting gun is fired on the starboard quarter or directly aft, the crew of the after 8-inch gun cannot remain at their gun. The inability to fire parts of the secondary battery under certain conditions is due to the great arc of fire given to the 8 inch guns. This can hardly be called a defect. It is thought that a screen can be placed between the 8 and 6 inch guns which will enable them to be worked together forward or aft. The Board states concisely its opinions as to the changes demanded, which consist principally in the method of fastening the bearing surfaces to the steel deck, the construction of clips and clip circles, &c. The report says, in conclusion, the plan of testing the hull, guns and fittings of the Atlanta, arranged by the Board, contemplated a more extended use of the main battery, but the weakness developed in the port sills and in the sockets of the 8 inch carriages rendered further firing inadvisable.

There will soon be made on the Pennsylvania Railroad a test of certain new features in ties and rails which are now being used on the London and Northwestern Railroad. Steel ties are to be used, and the rail will be held by a key resting in a chair on the tie. The chair consists of three steel strips, one of which is placed between the tie and the rail, so as to stiffen the latter locally and prevent the weight from breaking through the thin steel tie. The other two pieces of the chair hold the rail laterally. After the rail is dropped into the chair the key is driven parallel with it and holds it firmly to the gauge. The engineering department of the company is having rails made to weigh 100 pounds to the yard, which are to be put down as an experiment. These will be 20 pounds to the yard heavier than any now in use.

The Grant Corundum Wheel Company, of Springfield, have withdrawn their Western agency from Messrs. C. H. Besly & Co., of Chicago, and established a separate office at 106 West Washington street, Chicago, which will be conducted by Mr. L. H. Cowles. They manufacture corundum wheels and grinding machinery, and deal in grinders' and polishers' supplies. A full stock will be kept on hand at their Western office, but large orders will be shipped from the factory directly to the purchaser, thus saving freight.

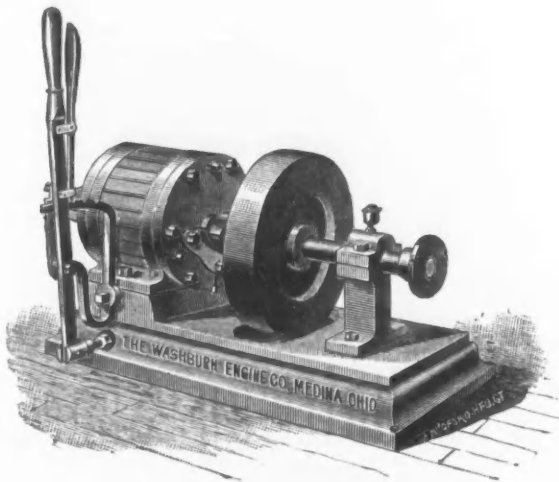


Fig. 1.—The Washburn Boat Engine.

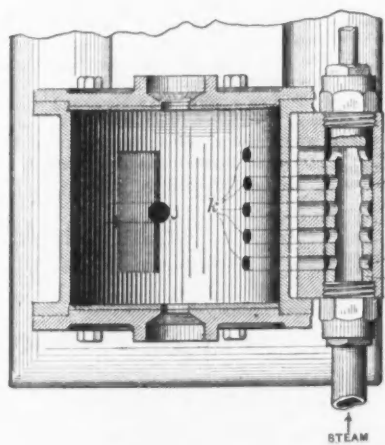


Fig. 3.—Longitudinal Section of Cylinder and Valve Chest.

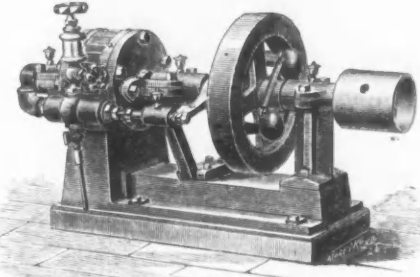


Fig. 2.—Stationary Engine.

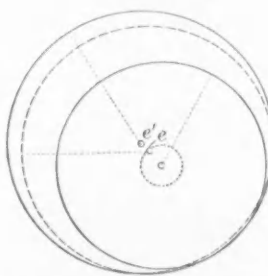


Fig. 5.—Diagram Illustrating the Two Bores of the Cylinder.

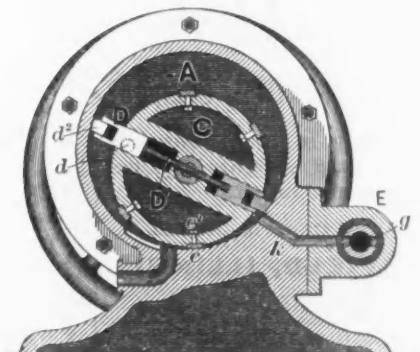


Fig. 4.—Cross Section.

THE WASHBURN ROTARY ENGINE, BUILT BY THE WASHBURN ENGINE COMPANY, MEDINA, OHIO.

centric with the cylinder. This piston-wheel, as it is called, fits snugly between the cylinder heads and closely approaches the bottom of the cylinder between the steam and exhaust ports *k* and *J*. It is, moreover, grooved lengthwise and fitted with packing strips, *c*, which are pressed outward by screws, *c'*, as shown in Fig. 4. It will be noticed that the piston wheel does not touch the bottom of the cylinder, but is kept steam-tight by this packing, one of the packing strips always being between the ports *J* and *k*. Deep radial slots are arranged longitudinally on opposite sides of the piston-wheel. In these are fitted the wings or pistons *D*, rigidly connected by the rod *D'*, which passes through a hole in the shaft and also through holes in the walls of the wheel *C*, at the bottom of the slots. The working cylinder is bored from two centers, *e* and *e'*, Fig. 5, located relatively about as shown, the diameter of the bore from the latter being considerably the largest. The two bores run approximately together near the steam ports *k*, the line of the larger bore falling inside the smaller one at this point.

As there is but a limited space between the wheel *C* and the cylinder where the induction ports *k* enter, a series of these ports is arranged in line lengthwise of the cylinder, all leading into the valve chamber *E*. The valve *G* is a hollow cylinder with annular grooves, *g*, that correspond with the ports *k*, leaving the ridges between broad enough to cover the respective ports when the valve is moved endwise. Holes are made through the walls of the valve to intersect the grooves *g*. A valve-stem passes out through a suitable stuffing-box, and is connected with a suitable governor arranged to move the valve endwise, by means of which the flow of steam to the engine is controlled, regulating the speed. This arrangement practically supplies a balanced valve. The pistons *D* (Fig. 4) are furnished with friction rolls, *d*, and grooves fitted with packing, *d'*, held out by springs.

In operating the engine, suppose the position of parts to be that shown in Fig. 4, in which the one piston having just passed the induction ports is receiving the pressure of steam from underneath, while the space in the cylinder above the pistons is of course filled with steam. It will be seen that there is exposed to the steam pressure but a small area of the piston adjacent the induction ports, while the opposite piston has a larger area exposed, giving, therefore, a larger preponderance of pressure to drive the engine. As the pistons advance from this position the left hand piston decreases and the right hand piston increases its exposed area until a position is reached where the pistons are exposed equally and the largest steam space is attained, and consequently the maximum expansion of steam allowed is reached, and as no further motive power can be had in the engine for the steam be-

ward piston reaches the exhaust port, there is no dead center. The mechanism for adjusting the parts is simple and convenient. We should add here that the piston-wheel *C* is adjustable, the supports for the shaft being held by bolts passing through elongated holes. Fig. 1 shows the engine for boating purposes, arranged with a reversing lever. Fig. 2 represents the ordinary form of stationary engine. The engines are made in sizes of 1, 2 and 4 horse-power.

## Corrugated Rolled Steel Tires.

An ingenious and useful application of the principle of corrugation has been made by Mr. William Fox, of the Leeds Forge Company, Leeds, England, whose brother has earned an excellent reputation in connection with his corrugated boiler flues. Mr. Fox has applied corrugation to the tires of wheels for road traffic in a very simple manner. By the peculiar path described by the corrugations when revolving, the wheels are prevented entering the street car grooves, and they also serve to effectually mount the inequalities formed by the sides of the rails and the paving joining up to it, which latter is frequently worn down below the edges of the rails. It need hardly be pointed out that on street-car routes all vehicles are liable to slide in crossing or driving on or about tram lines, the effect being to injure the wheels or seriously twist the carriage, so as to render driving on such routes unsafe and dangerous. Fox's system of corrugated rolled steel tires are claimed to effectively prevent any jerking, locking or skidding when driving on or about tram lines, no matter at what angle. The route is said to be rendered so smooth and easy that the presence of the car rails can scarcely be detected. The tires are as easily fixed to the ordinary form of felloes as are the plain tires, and besides obviating the risk of accident in driving they protect the wooden felloes of the wheels from being damaged by the curbstones when drawing up or turning corners.

## A New Compound Locomotive.

Mr. John Player, master mechanic of the Central Iowa, who is making for himself an enviable reputation as an inventor and a very successful railroad master mechanic, has worked out the details of a compound locomotive which appears to possess the requirements of a successful machine. The 17 by 24 cylinders of an ordinary locomotive are utilized as the low-pressure cylinders, and the high-pressure cylinders are placed in front, tandem from the connections between the high and low-pressure cylinders, being similar to the arrangement of the steam and air cylinder on a Westinghouse pump. Both valves on each side are worked from the same rocker arm, and means are provided for admitting wire-drawn live steam into the low-pressure cylinder as an aid in starting.



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## AN OPPORTUNITY FOR MANUFACTURERS.

The very best advantages for new manufacturing enterprises in the South are offered by the

## GATE CITY LAND COMPANY.

Birmingham, Alabama. The Company's property lies just out of the city of Birmingham, and is traversed by four of the trunk railroads running into the city. It possesses the general advantages of the Birmingham district, including a fine deposit of red hematite iron ore and large quantities of lime rock and building stone. One of its notable peculiar advantages is a pure white glass sand, pronounced by a Northern authority the finest of the kind in the country; while a variety of other sands of lower grade are found on the lands. The latter also have exceptional advantages for a paint mill. The recent large investment of Northern capital in Birmingham furnace property may be taken as conclusive testimony to the splendid advantages of the place for making pig iron. It has twenty furnaces in operation or building; also, in operation, a large rolling mill, stove works, cast-iron pipe works, foundries and machine shops, and a variety of other iron working enterprises. There are now located on the Gate City property a rolling mill, iron safe works, a pottery and several smaller enterprises. The company is now ready to correspond with other manufacturers who may wish to locate in the South, and share in its new prosperity. Every enterprise about Birmingham has all the business it can do. There is room for new concerns in all lines, and the undersigned has eligible manufacturing and residence sites to offer to all.

ROBT. WARNOCK, Pres., Gate City Land Co.

## ATTENTION,

## Capitalist - and - Foundryman.

An Incorporated Company offers for sale State Rights to manufacture, and sell a valuable Patent Boiler (for house-heating). Hundreds in successful operation, which can be referred to for full particulars.

Address Box 1006,

WORCESTER, MASS.

New England States reserved.

## FOR SALE.

## THE MACHINE SHOP AND FOUNDRY

with six acres of land, now occupied by

THE STILES & PARKER PRESS CO., situated in the city of Middletown, on the Connecticut Valley Railroad. This is the only Jobbing Machine Shop and Foundry on the Connecticut, between Hartford and the Sound and has the patronage of most of the surrounding towns; possessing good facilities for freightage by the Connecticut River and three railroads. Proposing to remove our business from the city, we will sell this property at a reasonable price, and part payment may be made in cash, or on credit, given about October 1st. Apply on the premises, or by letter to

N. C. STILES, Treasurer.

## VALUABLE IRON MINE FOR SALE.

This property covers an area of 300 acres and exhibits at various points an ore giving 60 per cent. of iron—furnace best—no sulphur or phosphorus. The property is situated within 10 miles of Ottawa and is most favorably placed for mining operations. The highest reports upon the property have been received from first-class experts. Title perfect. The new Canadian Iron tariff makes this a most valuable property. Samples of the Ore and further particulars can be obtained by applying to the Manager—Ontario Bank, Ottawa, Canada.

## FINE BUSINESS CHANCE.

FOR SALE, an established HARDWARE, TIN, QUEENSWARE and STOVE BUSINESS of five years' standing, in one of the best towns on the Texas and Pacific R.R., 23 miles West of Fort Worth, Texas, in the heart of the cattle and sheep district of the State of Texas, with a population of 3000, and growing every year; stock about \$8000 or \$9000, all fresh and new. For particulars, address GEO. MILLER, Colorado, Texas.

## FOR SALE.

A rare chance to buy a clean and well-sorted stock of

## HARDWARE, STOVES &amp; TINWARE

in one of the best towns in Michigan. Stock will invoice \$6000. The best of reasons for selling. Address "JAP," office of The Iron Age, 66 and 68 Duane St., N. Y.

## FOR SALE, a large and well-sorted stock of

## HARDWARE.

A long-established and profitable business at the old hardware stand, No. 36 1/2 Street, Jamestown, N. Y. Advantageous lease of store extending to May 3, 1891. Business includes several valuable specialties. The entire business will be sold at a bargain. Complete inventory ready for inspection. For particulars, address A. FRANK JENKINS, Administrator of the estate of D. C. Hackus, Jamestown, N. Y.

## FOR SALE—A clean stock of GENERAL

HARDWARE that will invoice \$5000 and over; located in one of the best, neatest and cleanest towns in Ohio, with a good trade, and for 12 years in the same town; low rent; we have not sold tin and stoves, nor implements, with these added, sales would reach from \$5000 upward; terms of sale, cash, or as good, in bankable paper; no real estate taken. For particulars, address STULL & CHARLES, Ashland, Ohio.

## FOR SALE.

At GREENWOOD, OHIO, on C. & A. R. R., in one of the finest farming cities of the Northwest, a general hardware and grocery store, with entire stock of goods; a fine residence with good dwelling house and ornamental trees; fine fruit; fine well of water and a cistern; 2 acre lot; good stable and outbuilding; a good place to live and good trade; all clear of debts; best bargain ever offered; will double in 10 years; worth \$7000 to a lively business man. J. C. HORINE, Wren P. O., Ohio.

## FOR SALE.

## A GOOD CLEAN HARDWARE STOCK.

in a town of four thousand inhabitants in Southern Dakota; annual sales, \$35,000. This is a rare chance and will bear investigation. Cause of selling, death in family. Address "LOCK BOX 123," Mitchell, Dak.

## FOUNDRY FOR SALE.

One of the best located

## STOVE FOUNDRIES

in the Ohio Valley for sale on reasonable terms. Located in a town of 1000 inhabitants, with shipping facilities second to none. Natural gas rights alongside of the works. If sold soon will go at \$6000. Address J. T. HANES, Martin's Ferry, Ohio.

## WANTED TO SELL, the leading HARDWARE

BUSINESS of Denver, Col., located in the heart of the city; good fixtures and one of the best-equipped stocks in Colorado. For further particulars, address No. 206 Jay St., Denver, Col.

## Special Notices.

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## FOR SALE.

## THE MELVIN SEWING MACHINE CO.'S FACTORY AND GROUNDS.

located in Chillicothe, Ross Co., Ohio, and adjoining the depot grounds of the C. W. & B. and Scioto Valley Railroads. The main building is of brick, 133 x 33 feet; three stories, slate roof, well-lighted and floors 6 in. thick. The Engine, Boiler and Japan rooms and Blacksmith shop are all of brick and covered with tin. The whole building heated by steam and lighted by electricity. It contains a 45 horse-power Reynolds-Corliss Engine, a 75 horse-power Babcock & Wilcox Boiler and Edison Dynamo, all in good condition. One house and lot and three vacant lots, all adjoining the factory grounds. This is a desirable property for manufacturing purposes, and will be sold at a bargain. For further particulars call on or address

NELSON PURDUM, Receiver,

Chillicothe, Ohio.

## SALE BY TENDER OF AN AGRICULTURAL

## IMPLEMENT WORKS.

Whiting vs. Dowling.

Tenders will be received by the undersigned up to the first day of September, 1887, at twelve o'clock noon, for the purchase of the following lands and premises: Lots Nos. 14, 15 and 16 on the East side of Waterloo Street; Lots 2 and 3 on the North side of Duke Street, running half way through to Wadsworth Street in the City of Brantford. On the above premises there are erected large machine shops fully equipped with the latest machinery. Also a Paint Shop, Dry Kiln Barn and other buildings, which premises were lately occupied by the Farm Implement Manufacturing Co.

Terms of Sale.—The purchaser will be required to lay down 10 per cent. of his purchase money on his tender being accepted and the balance within one month thereafter, with interest at 6 per cent. per annum.

For further particulars apply to Chas. Champion, Brantford, Ontario, Canada, or the undersigned.

Any tender not necessarily be accepted.

Dated at Brantford, the 10th day of July, 1887.

H. McK. WILSON,

Solicitor for Trustees.

## FOR SALE OR TO LEASE.

at Perth Amboy, New Jersey, adjoining wharves of the Lehigh Valley R. R. (30 feet of water, admitting largest ocean steamships without obstruction of any kind), 1200 feet of dock front by 4000 feet in depth. This property is crossed by the Lehigh Valley Railroad, the Pennsylvania Railroad and the N. J. Central Railroad, and, besides being one of the finest Harbors on the Coast, is also on the Delaware and Chesapeake Canal Towing Line. Thirty feet of Water in front of property, and three Railroads, Lehigh Valley, N. J. Central and Pennsylvania, all crossing the tract. See map on page 37. Address

WILLIAM T. MEREDITH,

No. 48 Wall St., New York.

## WANTED—PARTNER WITH CAPITAL to go

into the Foundry business. Excellent facilities and location. Address for full particulars

"LOCATION,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

## TO LEASE—A VERY ADVANTAGEOUS LOCATION for a Pipe or

## GENERAL FOUNDRY.

Water power and buildings ready for use; near New York. Excellent transportation facilities to all large towns and cities. Address

"PIPE,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

## FOR SALE, A STOCK OF

## HARDWARE, TINWARE AND QUEENSWARE

Buggies, Spring Wagons, &c.—in fact, everything usually kept in a country hardware store; also store Room, 30 x 50 feet, with 30 doors, 30 x 24, on back, and one, 16 x 50, on side; stock will invoice about \$2000, building is worth \$1200; also dwelling house in eight rooms, with wardrobe and parlors, good well and cistern, wash house, wood house and good stable with one and a half lots worth \$1000. Address

J. M. SMITH, Pulaski, Iowa.

## FOR SALE—Stock of Iron, Steel, Wagon and Car

riage material, both iron and wood; also, large, convenient Store Room, located in growing manufacturing and now booming city of Quincy, Ill., the second city in the state, population about 40,000; quite a railroad centre, and on the great Mississippi River. Excellent traveling territory on every side; for fine rich country scarcely equalled. Business established twenty years. Money made every year. The only store of the kind in the city. Reason for retiring, bad health.

LEMLEY BROTHERS,

Quincy, Illinois.

## RAKE OPPORTUNITY.—A first-class MALLE-

ABLE IRON WORKS located in the City of Rome, N. Y., for sale at half its value.

A. ETHRIDGE, Rome, N. Y.

## BUSINESS FOR SALE.

In one of the largest Western cities; chiefly cutlery; established twenty-five years; must sell on account of ill health; capital required at least forty thousand dollars; possession January 1st next, or sooner if required. For further particulars, address

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Office of The Iron Age, 66 and 68 Duane St., N. Y.

## HARDWARE BUSINESS FOR SALE.

Splendid opportunity; best location in Central New York; established nearly fifty years ago; business never better than the present season; stock will be sold at a bargain. Address

"HARDWARE," Box 910.

Office of The Iron Age, 66 and 68 Duane St., N. Y.

## FOR SALE AT A BARGAIN.

A clean and complete stock of

## HARDWARE

in Northern Michigan. About \$12,000. Address

"HARDWARE STOCK,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

## A RARE BUSINESS CHANCE.

On account of very poor health I am obliged to sell my new, clean and well-sorted stock of

Hardware, worth about \$4500. In the young and growing city of Ashland, Clark Co., Kansas. Good terms, good will and influence to party buying. Address A. J. KINNEAR, Ashland, Clark Co., Kas.

## FOUNDRY AND MACHINE SHOP in this city

FOR SALE or to lease on a long lease.

Address

"F. & M. S.,"

Office of The Iron Age, 66 and 68 Duane St., N. Y.

## Special Notices.

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## FOR SALE.

A plant suitable for the manufacture of Agricultural Machinery, consisting of two large, commodious buildings—one for iron and wood-working machinery, the other for finishing, painting and shipping, and other buildings for storage. Also, on same ground and in connection with it, a large foundry and smith shop. The whole is stocked with a full supply of the best makes of iron and wood-working machinery, necessary small tools, with complete sets of patterns for manufacturing Reapers, Mowers and Self Binding Harvesters, all of which are in excellent condition and practically as good as new.

It is desirable to sell the above as a plant, and an excellent opportunity is here offered to any one wishing to engage in manufacturing. Should parties desire to purchase machinery alone, would sell the same separately.

For further particulars address

## DORR Y MACHINE COMPANY,

MILTON, WAYNE COUNTY, IND.

## FOR SALE.

A MANUFACTURING ESTABLISHMENT, nearly new, at Guilford, Conn., on the Shore Line Division, N. Y., N. H. & H. R. R., consisting of a two-story brick Building, 30 x 70 ft.; a two-story brick addition, 22 x 36 ft.; a one-story addition, 14 x 22 ft., and a boiler room, coal shed and store house. A full complement of the most improved machinery for manufacturing Vegetable Ivory Buttons. Forty horse-power Engine and 50 horse-power boiler. Everything in running order. Convenient to tide-water. For particulars apply to E. H. BUTLER, Receiver, Guilford, Conn.

## FOR LEASE. NAIL FACTORY.

complete, with all necessary appliances for economy in manufacturing, located at Duncansville, Pa., on the line of Penn. R. R. Factory contains 25 Machines, making from 300 to 500 spikes and run by 12 x 40 in. engine. Coal delivered at works at \$1.40 per ton, siding within 100 feet of Factory.

Will sell the Nail Machines and lease Factory with power.

A. R. WHITNEY & CO.,

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## TO MANUFACTURERS.

Wanted the WESTERN AGENCY of EASTERN

MANUFACTURERS by an energetic Hardware

Salesman familiar with the trade. Address, stating particulars, "CHICAGO AGENCY," office of

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## STEEL RAILS.

## The Springfield Iron Company

are now ready to take contracts

for all standard weights for delivery in July and later.

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Chicago Office, 115 Dearborn St.

## METALLURGICAL ENGINEERING.

We are prepared to furnish

PLANS, SPECIFICATIONS

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ESTIMATES

AND TO

SUPERINTEND THE CONSTRUCTION OF ROLL-

ING MILLS AND MACHINERY, RE-

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TUBE AND PIPE MILLS,

ETC., ETC.

We represent the latest improvements in all the above branches.

SMITH & LAUGHLIN, Successors to M. V. Smith,

Metallurgical Engineer,

Rooms 16, 17 and 18 Bissell Block, Pittsburgh, Pa.

## Aluminium, "the Metal of the Future."

The Only Treatise in the English

Language.

Aluminium: Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloys. By Joseph W. Richards, A. C. Chemist and Practical Metallurgist. Member of the Deutsche Chemische Gesellschaft. Illustrated by 16 engravings. 12 mo., 346 pages. Price, \$2.50, free of postage to any address in the World.

Content: Part I. History of Aluminium. II. Occurrence of Aluminium in Nature. III. Physical Properties of Aluminium. IV. Chemical Properties of Aluminium. V. Metallurgy of Aluminium. VI. The Manufacture of Sodium. VII. Manufacture of Aluminium. VIII. Manufacture of Double Chloride of Aluminium and Sodium. IX. Manufacture of Aluminium by other Reducing Agents than Sodium. X. Working of Aluminium. XI. Alloys of Aluminium. Appendix. Addenda. Index.

A circular showing the full table of contents of this volume will be sent free of postage, to any one in any part of the World who will furnish us with his address.

HENRY CAREY BAIRD & CO.

Industrial Publishers, Booksellers and Importers,

810 Walnut St., Philadelphia, Pa., U. S. A.

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In every manufacturing town to sell

DuPlaine's Plumbago Babbitt Metal.

Very liberal discount allowed and every inducement given you to make sales. Remember these are the Best Anti-Friction Metals made.

Address

E. A. C. DUPLAINE,

Send for Circular. CHICAGO, Ill.

TIN or METAL ROOF painted with two coats of Dixon's Silica-Graphite paint, and a third coat the following season, will not need painting again for 10 years or longer.

JOS. DIXON CRUCIBLE CO.,

Jersey City, N. J.

## IMPORTANT.

Wanted Cast Wrought Iron and Steel Turnings.

Address, THOMPSON C. GILL & CO.,

Dealer in Iron and Steel of all kinds, 210 South 14th Street, Philadelphia, Pa.

## Special Notices.

## HELP WANTED.

Undisplayed Advertisements for Help Wanted not exceeding fifty words One Dollar each insertion. Additional words two cents each.

BY A CHICAGO Shelf Hardware Manufacturer and Jobbing House, a man to work on catalogues and price-lists and order woodcuts. None but those who have had successful experience in this branch need apply. Position permanent to right party. State age, experience, reference and salary expected. Address "BOY BEE," Office of The Iron Age, 95-97 Washington street, Chicago, Ill.

A competent DRAUGHTSMAN, accustomed to steel-working machinery, who can speak German and English, address FENCOYD IRON WORKS, Philadelphia, Pa.

A good SALESMAN, traveling in the South and West, to sell Gas Stoves, Sash Holders, &c. Address LAMON & KETCHUM, 60, NORWALK, Conn.

TRAVELER TO SELL TABLE AND POCKET CUTLERY to the retail trade in the Eastern States on commission; also one each for New York State, Pennsylvania, Ohio, Indiana and Michigan; only those need answer who have an established trade and who wish to add above goods to their line. Address "CUTLERY," Box 275, Office of The Iron Age, 66 and 68 Duane St., New York.

## SITUATIONS WANTED.

Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

A position as CLERK in Hardware business; have a thorough experience. Address LACKENBAUER, 319 Division Ave., Brooklyn, N. Y.

BY A practical MACHINIST as Chief Engineer or taking charge of Machinery; 25 years' experience in building and running machinery, blast furnace and rolling mill; best of references given if required; for further information address "CHIEF," office of The Iron Age, 66 and 68 Duane St., N. Y.

AS FOREMAN.—A first-class Foundryman 20 years' experience as foreman on all kinds of machinery castings; thorough knowledge of loam, dry and green sand work; capable of mixing and selecting iron and handling men to advantage. Best reference given. Address "WREN," office of The Iron Age, 66 and 68 Duane St., N. Y.

YOUNG MAN WITH TEN YEARS' EXPERIENCE as Assistant Superintendent of Steel Works, at same time filling position of Head Bookkeeper, Correspondent, &c. Would like to be employed as MANAGER, Superintendent or Assistant Superintendent, or would accept position as Bookkeeper or Correspondent in Steel or Iron Works or Machine Shops. Address "D," Box 717, Office of The Iron Age, 66 and 68 Duane St., N. Y.

TWO TRAVELING SALESMEN of undoubted character, ability and experience, desire to make arrangements to represent first-class manufacturer. "C. S.," Box 48, Office of The Iron Age, 66 and 68 Duane Street, New York.

A POSITION AS MANAGER OR FOREMAN in Open-Hearth, Bessemer or Clapp-Griffith Steel plants; have had 16 years' practical experience in the working of steel of all descriptions and can give the best of references. Address "STEEL WORKER," Office of The Iron Age, 66 and 68 Duane St., N. Y.

CHEMIST having for eight years had charge of laboratories of Blast Furnaces, Open Hearth and Bessemer Steel plants, is open for engagement. Address "N. N.," 2205 Eoff Street, Wheeling, W. Va.

A PARTY THOROUGHLY POSTED in heavy Hardware and Woodstock business and personally acquainted with the entire trade of the West, wishes lines in Hardware, Iron, Steel, Nails, Springs, Axes, Bolts, Tools, &c., and all kinds of Woodstock, Lumber, Spokes, Felloes, Wheels, Bodies, Gears, &c., ON COMMISSION. Will travel as far West as Salt Lake and visit all the principal cities every 30 days. None but first-class manufacturers wanted. No commission asked until goods are forwarded. For full particulars, reference, &c., address "W. 27," office of The Iron Age, 66 and 68 Duane Street, New York.

CIVIL and MECHANICAL ENGINEER, with good English qualifications, wants employment. Thoroughly practical. Address "ENGINEER," P. O. Box 372, Brantford, Ontario.

FOUNDRY FOREMAN, well posted in loam, green and dry sand molding, wants a change. Has large experience in rolling-mill, blast furnace and engine works. Would like a railroad shop. Address "FOUNDMAN," office of The Iron Age, 95 and 97 Washington Street, Chicago, Ill.

BY A FOUNDRY FOREMAN, at present engaged in a large iron foundry running both heavy and light work; is familiar with loam, dry and green sand work; well posted in mixing charcoal, coke and anthracite irons, in melting with coal or coke; can give good results with either; used to handling men. Address "Box 222," office of The Iron Age, 66 and 68 Duane Street, N. Y.

MECHANICAL ENGINEER OF LONG EXPERIENCE, competent to design, construct and superintend building of engines and machinery of any kind and for any purpose, is open for re-engagement. Preferred with parties that would take interest in and introduce valuable patented invention wanted on all kinds of engines, compressors, &c. Address "M. E.," office of The Iron Age, 66 and 68 Duane St., N. Y.

A WELL-KNOWN FOUNDRYMAN, 37 years of age, wants position as FOUNDRY FOREMAN with a first-class firm in the North or West, is capable of superintending iron works employing from 100 to 300 men; is a practical mechanic on general and special heavy and light work in green and dry sand and has considerable knowledge of loam molding. Specialty on mixtures for car wheels, chills and sand cast, and all kinds of chill and soft mixtures. At present has management of foundry employing 200 men on machine, jibbing, locomotive, car and rolling mill work. Good reference. Address "ENERGY," office of The Iron Age, 66 and 68 Duane Street, New York.

MECHANICAL DRAUGHTSMAN, graduate M. E., with first-class references, wishes a position; able to take charge of drawing office and act as Assistant Superintendent; can offer knowledge against capital; the three languages fluently; 14 years' American and European experience. E. S., 24, Office of The Iron Age, 66 and 68 Duane St., New York.

A GENTLEMAN who has had an extensive business experience and who possesses business abilities of a high order, would like to make an arrangement to take charge of a Chicago Agency for some first-class Eastern manufacturing firm. Best of references, both East and West. Address "H.,"



## Special Notices

MISCELLANEOUS.

Proposals for Steel-cast Guns for the Navy

NAVY DEPARTMENT.

WASHINGTON, D. C. June 23, 1887

Under authority conferred by the act of Congress, approved March 3, 1887, making an appropriation "for the purchase and completion of three steel-cast, rough-bored and turned, six inch high-power rifle cannon, of domestic manufacture, one of which shall be of Bessemer steel, one of open-hearth steel, and one of crucible steel, sealed proposals from domestic manufacturers, to furnish the same, will be received at this office until Tuesday, the second day of August, 1887, at twelve o'clock noon, at which time the proposals will be opened.

Proposals may be made either to furnish three completely finished six-inch, breech-loading, high-power rifles, of Bessemer steel, one of open-hearth steel, and one of crucible steel, or three unfinished, rough-bored and turned castings for such cannon, to be supplied with barrel, respectively, to be finished by the Department in accordance with the bidder's design.

\* \* \* \* \*

No gun or casting for a gun will be paid for until the bidder has been compelled to complete. Those who have successfully stood the statutory test, required by the act of July twenty-sixth, eighteen hundred and eighty-six, entitled "an act making appropriations for the fiscal year ending June thirtieth, eighteen hundred and eighty-seven, and for other purposes." (For statement of requirements of said tests and of the specifications to be observed, reference is made to "specifications" which can be had upon application to the Department.)

Proposals may be made for one or more guns, or for one or more castings as aforesaid, \* \* \* [but must be made separately for each gun or casting for a gun and upon forms prepared by the Department.]

Each successful bidder will be required to execute, within fifteen days after notice of award, a formal contract in accordance with his proposal.

Copies of the specifications, with blank forms of proposals, and all additional information desired, can be obtained on application to the Bureau of Ordnance, Navy Department.

All proposals must be in duplicate, enclosed in envelopes marked "Proposals for Steel-cast Cannon," and addressed to the Secretary of the Navy, Navy Department, Washington, D. C.

The Right reserved to waive defects in form  
and to reject any or all bids.

WILLIAM C. WHITNEY,  
*Secretary of the Navy.*

NAVY DEPARTMENT,  
WASHINGTON, D. C., June 20, 1887.

In order to give more time to domestic manu-  
facturers to consider the matter, the period  
limited for the reception of proposals for steel-  
cast guns is hereby extended, and such proposals  
will be received, under the foregoing advertise-  
ment, as modified, until Tuesday, the twentieth  
day of September, 1887, at twelve o'clock noon, at which  
time the proposals will be opened.

WILLIAM C. WHITNEY,  
*Secretary of the Navy.*

Sharon Steel Casting Co.

SHARON, PA.

—

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very for Steel Castings of all kinds, from one pound up to fifteen tons. Send specifications for prices. All work guaranteed equal to any

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**EUGENE BISSELL, Auctioneer.**

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**HAYDOCK & BISSELL,**  
Successors to  
ROBERT R. HAYDOCK & CO., and E. BISSELL & CO.  
WHOLESALE

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**HARDWARE AUCTIONEERS,**  
12 Murray St. and 15 Park Place, N. Y.

Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

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**WE BUY**  
all kinds of  
IRON AND STEEL SCRAP, BURNT IRON, OLD  
RAILS AND CAST BORINGS  
(in carloads only). Write us, naming quantity  
and price.

**ROBINSON & ORR,**  
115 Water St., Pittsburgh, Pa.

(ESTABLISHED 1859.)

**WANTED.**

**IRON AND**

**STEEL SCRAP.**

Address

**VALENTINE & ARMSTRONG,**

226 S. Fourth st., Philadelphia, Pa.

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**SPECIAL NOTICE.**

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We have constantly on hand large lots of OLD IRON and METAL to be sold cheap. Send for quotations,

**PETTIS & HIGGINS,**

301 Fountain St., Providence, R. I.

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**WE WANT**

## WE WANT

No. 1 Wrought Scrap Iron; Wrought Iron Turnings; Steel Turnings; Cast-Iron Borings; Burnt Iron, &c.

JOS. J. LIPPINCOTT & CO.,  
342 Walnut St., Philadelphia

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**WANTED,**

## Iron and Steel Scrap.

**Iron and Steel Scrap**

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We buy all kinds of Iron and Steel Scrap  
Write to us when you have any to sell.  
**SITES, WHEELER & CO.,**  
222 and 224 So. Third Street,  
Philadelphia, Pa

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**FOR SALE.**

Ten (10) No. 2 Siemens' Regenerative Gas Lamps,

with Factory Fixtures and Reflectors complete  
and in order; only used three or four months  
Will be sold cheap.

DANVILLE NAIL & MFG. CO.,  
Danville, Pa.



## THE WEEK.

Electrical machinery will be the chief feature in the next fair of the American Institute, in this city. The principal manufacturers of electrical appliances in this country have promised to take almost half of the space in the Third Avenue building. No prizes will be offered.

France has obtained exclusive control of the trade of Cochinchina, through the Chamber of Commerce at Saigon, where a custom house service has been established and duties are imposed practically prohibitory of all merchandise not strictly of French origin or fabrication. There are, it would appear, no exemptions from the duties as established, as they will be enforced against all classes of merchandise, including cotton piece goods, woollens, iron, manufactured and unmanufactured hardware generally.

Several railroads in the Northwest are said to contemplate a direct connection with Duluth if the right to construct bridges can be obtained, in order to control a larger proportion of lake traffic, and likewise propose to establish at Wisconsin Point, near Duluth, docks and other facilities for building vessels of iron and steel.

A company have been organized at Sault Ste. Marie, Mich., to utilize the power of the St. Mary's River, connecting Lake Superior with Lake Huron. There is a fall of 18 feet in a distance of  $\frac{3}{4}$  mile. It is proposed to cut a water power canal from a point above the falls to a point below, from which an almost unlimited flow of water may be obtained. It is said the capital, \$1,000,000, is secured, and that the canal is to be completed in two years. One object in view is to grind wheat into flour on the way down from Duluth.

A fire at Evansville, Ind., on the 3d inst., destroyed 7,000,000 feet of lumber, and the same day 3,500,000 feet were burned at East Saginaw, together with John G. Owen's mill.

Detroit claims to have a population of nearly 240,000, and that no manufacturing city of equal importance 10 years ago has since forged ahead of her.

The dissolution of the injunction against the Arthur Kill Bridge, under the decision of Judge Bradley, at Trenton, is expected soon to make available 10 miles of the best water front in New York harbor.

The Transatlantic fleet of steamers will, within the next year, be increased by half a dozen new vessels, most of which are now in process of construction. A conservative estimate of the cost of these vessels is \$7,500,000. The tendency as to model is to increase the breadth of beam in proportion to length.

The total pork packing of the West since March 1 is 3,615,000 hogs, which is nearly the same as for the corresponding period last year, but the five centers east of the Mississippi show a falling off of \$65,000. Chicago is badly behind.

American wheat is selling in English markets 5 per cent. below the inferior qualities from India, a fact which the Chicago *Tribune* attributes directly to the gorge of fully 9,000,000 bushels of old wheat in that market, brought about by speculative schemes, and this at a time when the storage room should have been available for the new crop. The writer says: "The members of the Board of Trade and their former customers, between them, have depressed the price of wheat to the lowest figure known in the last quarter of a century, oats and rye to a nearly equal extent, and have not done so with corn simply because of fears that the latter will turn out a poor crop this year. Apparently both must now bear the consequences of their own acts, and it is unfortunate for other innocent producers that they too have to accept minimum figures for about all they have to sell."

The new belted ironclad, named Alexander II., was recently launched on the Neva from the new Admiralty dockyard in the presence of the Emperor and with a fusillade of heavy guns. The following are the dimensions and fittings of the vessel: Length, 326 feet, or including ram, 350 feet; beam, 67 feet; draft, 23 feet; displacement, 8,440 tons; compound engines, of 8500 horsepower; armament, 14 long-range cannon, besides rapid-firing guns and torpedo ejectors. The construction was begun in August, 1884.

An association of salt manufacturers, in Michigan, have obtained control of the produce in that State and advanced prices from 51 to 70 cents per barrel.

A fire in A. R. Whitney's wire and nail factory, at Greenpoint, was caused by an over-heated iron plate in the annealing department. The damage was estimated at \$45,000 to \$50,000. The tin warehouse of E. B. Owens & Co., in Baltimore, also the stove warehouse of Liebrandt, McDowell & Co., in that city, were burned by a fire which originated in the cracker bakery adjoining. Wilbur F. Washburn's brass and iron works, in Youkers, were destroyed by fire on Friday. The fire is supposed to have been caused by the overheating of the brass-melting cupola. Loss about \$30,000.

Consul Deopre, at San Salvador, reports that base imitations of American hardware and other products of industry are put on that market in response to the demand for the cheapest goods. Iron machetes are sub-

stituted for those of steel as manufactured in Connecticut and New York. The trademarks of American artisans are stamped or imprinted on the worthless German implements. It is said that 50,000 machetes are sold annually in Salvador at an average price of \$3.50 each. Cutlery and Remington's repeaters sold in Central America were never in the United States. Cast-iron sewing machines, axes and beverages are supplied by Germany.

The region around Albany, N. Y., furnishes the largest part of the molding-sand used in the United States. It is found in deposits from 1½ to 2½ feet deep, for 4 or 5 miles back from the river on the west side of the Hudson, as far south as Coxsackie, and on both sides of the Mohawk up as far as Schenectady. There are three grades, brass and stove castings using the finest, and bridge-girders, &c., the coarsest. Along the Mohawk it is shipped in bulk in cars, elsewhere mostly in canal boats and schooners. Five hundred dollars per acre is often paid for the privilege of taking the sand from the land. In dry seasons it can be dug and shipped at once, but its quality is better when it is piled up and left over one winter.

The unwonted prosperity of water transportation is the subject of remark by the Chicago *Times*, which says: "Probably to an extent hitherto unequalled merchandise and produce of various kinds have sought the water routes, owing to the advance in transportation charges on land, and vessel owners are making such handsome profits on their investments that propellers, steam-barges and good-sized sail vessels are in good demand by investors, but small craft are given the cold shoulder, for their day has gone by. The shipments of lumber, coal, salt, iron ore, &c., have been remarkably heavy, and the shipments from the iron mines continue surprisingly large. Meanwhile, new enterprises are talked of, and the establishment of new lines of Lake transportation companies appears to be taking shape."

After three months' railroading under the Interstate Commerce law, Pittsburgh, says the *Commercial Gazette*, of that city, sends forth a shout of commingled praise and condemnation over the effects of the anti-freight discrimination legislation. In the Western coal trade the effects, while at first injurious, have been gradually ameliorating, and the operators think with a few more freight concessions they will prosper under it. The grain trade has not been injured, but its benefit to the local merchants is slight, owing to the absence of a State law. The window glass trade, which at first threatened to be diverted from its Western market, has come out benefited, owing to excessive rates, which allowed Pittsburgh manufacturers to ship "around the Horn" and crowd out Illinois glass in San Francisco.

A new organization for the manufacture of plate glass has been formed in Pittsburgh by Geo. Westinghouse and others, with a capital of \$500,000, and are selecting a location. The new plate works will make a specialty of thin glass, which they expect will to a great extent displace the larger sizes of double-strength glass that are now made by blowers. One explanation of their ability to place polished plate on the market is that there is no skilled labor in the process of manufacturing it, while the wages of glass blowers are remarkably high, so that when the cost of production is counted there will not be such a great difference.

The Burnham Industrial Farm, designed to furnish a good country home for unruly boys from New York and Brooklyn, has been in operation about a year, with excellent results. It comprises about 600 acres in Columbia County, and the boys are placed in cottages, not more than 20 under one roof, so that they can be kept under closer supervision until such time as they may be wisely released from restraint. Meanwhile they are under a course of manual training.

The east shore cantilever arm for the Poughkeepsie Bridge having been put to place, work is now in progress on the west shore cantilever arm.

Jute, from which bagging is made, and largely imported as a substitute for rags in paper manufacturing, can be grown in the South, if labor is available, to compete with the cheap labor of India. There is no reason why jute culture should not become an important branch of American industry and incidentally develop increased employment for machinery.

Liverpool as a maritime center may be said to rank foremost among the ports of the world. A day's shipping record given by a Liverpool journal shows that in 33 docks, with their several branches, and the five docks and branches at Birkenhead, across the river, there were 267 vessels. This does not include the ships of all kinds, from American liners to coasting schooners, which anchor in the Mersey from its mouth all the way up to Runcorn. They are not enumerated. On the same day there were 116 ships on the ocean bound for Liverpool, besides 95 homeward bound to receive orders on arrival in English waters. There are about 50 lines of steamers running out of Liverpool, of which 10 only are for other ports in the United Kingdom. All this is in competition with the port of London, from which several of the principal ocean lines clear, and which is the headquarters of an enormous sailing trade with India, Australia, China and South America, the vessels of which fill the exten-

sive London docks, Blackwall, East India and others. In competition also are Glasgow, near at hand, Bristol and Hull, besides such ports as Falmouth, Plymouth, Portsmouth, in the south, and Fleetwood on its immediate north. There are on the Irish coast the harbors of Dublin, or Kingston, and Queenstown and Belfast, that compete with Liverpool for what they can attract.

London newspapers have a prosperous field. The *Telegraph* is by far the richest in the city, its circulation being about 280,000 daily, with a net income of \$1,500,000 per annum. The *Times*'s circulation is about 60,000 and net income \$750,000. The *Standard*'s circulation is something like 200,000 and its income about equal to that of the *Times*. The *News*'s circulation is placed at about 100,000 and its income \$500,000. These, with the *Post*, are the principal London dailies.

The manufacturers and business men of Cleveland, not to be outdone by enterprising rivals, have issued a circular representing the advantages possessed by that city as a commercial center, in which they say: Cleveland is most favorably situated with reference to the supply of raw materials. It is the great entrepôt for Lake Superior and Canadian iron ores and copper. In 1886 there were received in Cleveland and at lake ports contributory to Cleveland 2,084,717 tons of iron ore, or nearly 60 per cent. of the entire Lake Superior output, the value of which on the docks here was in round figures \$12,500,000. It is the most central meeting point for the rich iron ores of Lake Superior, the celebrated coals from Connellsville, Pa., and all the limestone of Kelley's Island and vicinity, thus affording unusual facilities for iron smelting. Cleveland is the great receiving point for coal from the Mahoning, Shenango, Tuscarawas, Hocking, Connetton and adjacent valleys. In 1886 2,000,000 tons of bituminous coal were received here, 600,000 of which were shipped by lake. The iron business of Cleveland, in all its ramifications, amounts to an aggregate equal to one-third of the tax duplicate of the city. The investments in iron manufactures in 1886 were \$26,300,000, the number of employees, 17,950, and the value of product, \$31,650,000. There are manufactured in Cleveland agricultural implements, axes, boilers, bolts and nuts, bridges, car couplers, car wheels, electrical apparatus, fences, hardware, nails, iron pipe, pig, bar, sheet, rods, steel rails, boiler plate, safes and locks, saws, screws, sewing machines, shovels, iron ships, stoves, tacks, tools, wire nails, vapor stoves, &c.

The great reaper manufacturers, Whitely, Fassler & Kelly, of Springfield, Ohio, failed last spring with liabilities amounting to \$3,138,775, including \$700,000 of accommodation paper given to E. L. Harper, the Cincinnati financier, and the assets were about \$1,000,000. A committee who investigated the affairs of the concern are of the opinion that if Whitely, Fassler & Kelly are re-established they will be able to pay 30 per cent. of their indebtedness in five installments of 6 per cent. each. The Champion Machine Company gave Whitely, Fassler & Kelly accommodation paper to the amount of \$500,000, which the latter firm negotiated. The committee recommends that the holders of this paper accept 60 cents on the dollar, the creditors to be secured by a deed of trust made by Whitely, Fassler & Kelly to B. H. Warder, president of the First National Bank of Springfield.

The scheme for a Chinese railway is not regarded hopefully by the British consul at Tientsin, who says the Government insist that it shall be controlled by Government officers. What the result will be can only too surely be forecast from the fate of the China Merchants' Steam Navigation Company, which started with every advantage, and which in a few years became hopelessly involved through the incompetency and venality of the officially appointed directors.

An attempt was made by an Irishman, named Mooney, to blow up the British steamer *Queen*, of the National Line, while lying at her wharf in this city, by hurling a bottle of explosives on the decks, from a skiff which was rowed alongside. The flames were extinguished with difficulty and the miscreant taken into custody. At his rooms were found a variety of chemicals, and a brass tube identical with the shattered tube or fuse found after the explosion on the Dominion steamer *Wyandotte*, not long ago. The London police claim to recognize Mooney as one who was concerned in blowing up the Government Buildings in that city, also the Parliament Buildings at Ottawa and the André Statue, at Tarrytown, New York.

The East River tunnel scheme has been revived by a new organization, under the title of the New York and Long Island Railroad Company, with a nominal capital of \$100,000. The 13 incorporators include Walter S. Gurnee, Thomas Rutter, General Roy Stone, George R. Sheldon, Col. F. K. Hain and Oliver W. Barnes. According to the plans the tunnel is to run diagonally under the south end of Blackwell's Island, so as to permit the work to be carried on from eight or ten points simultaneously. There is to be a clear width in the tunnel of 27 feet, with a height of 21 feet, accommodating a double-track road. Electricity is to be used for lighting. There will be stations at short distances apart on both approaches, and elevators will be supplied for carrying passengers up and down in connec-

tion with the elevated railroad here. The western terminus will be in the old station yard of the New York Central Railroad, between Ninth and Tenth avenues and Twenty-ninth and Thirtieth streets. The depth of the tunnel below the surface of the water will be about 100 feet, rising to the surface under the cities in either direction at an inclination of about 60 feet to the mile. The tunnel will be 5 miles long. The advocates of the scheme say that the cost will be covered at the rate of \$1,000,000 a mile. They also say it will be completed by January, 1889.

Awakened Mexico is described by a correspondent at the capital, who says the republic has changed the old order of things completely. The revenue from the mines does Mexico more good and Spain less. The agricultural system inherited from the great estates of the continent is passing away, and American machines have been carried in by the new railroads. Wages have risen, manufactures have begun to thrive, commerce by land and water with this country has already attained dimensions believed impossible during this generation of Mexicans. Schools are everywhere; supported in part by the national, in part by the State Governments, and very generously by the Church, which now sees her duties in the new republican light.

The electric storage battery motor, as applied to an ordinary street car under the direction of William Wharton, Jr., & Co., had a practical test last week in Philadelphia, under the inspection of railway officials and others interested in electricity. The accumulators are small affairs. Eighty-four are used in each car, being ranged along the side and on the bottom under the flooring, which is slightly raised to give the needed room. The accumulators are charged at a central station, and the number of amperes (units of electrical strength) is decided by a delicate instrument looking like a compass and called an ammeter. On the occasion referred to the accumulators were charged up to 30 amperes, and this was calculated to give a regular speed of 5 miles an hour on the level for four hours, or the regular speed of 5½ miles an hour—which is that gained with horse-power—for six hours. The force is applied to the front axle by means of any electric motor. The cost of operating such cars (including depreciation of the batteries) is estimated as being from two-thirds to three-fourths the cost of horse-power.

A grand system of fraudulent speculation in the timber lands of the Ottawa region has been brought to the notice of the Quebec Government. In a statement from the prime minister it is shown that while immense fortunes are being piled up by the lumber lords, the owners of the property receive comparatively little for their lands. It was also stated that these timber lands, of which the lumbermen were only in temporary possession, are being passed from hand to hand as if the barterers were the owners of the property, and in this way speculators are enabled to realize fortunes out of what cost them practically nothing.

The 30 odd canneries in California will this season be put under full pressure, and as the fruit crop of 1887 promises better than ever before, and as the transcontinental roads have reduced their rates 25 per cent. compared with last year, to compete with the Panama line and the Canadian Pacific, the California packers promise to meet all domestic and foreign demands.

The commercial value of an adult emigrant arriving on our shores is usually computed at \$1500, or at the rate of \$1,500,000 per 1000. One of our commercial contemporaries contends that every new immigrant is an addition to our material wealth of at least the sum it would cost to produce him here. If he is a skilled laborer he possesses the added value of the expense of such an acquisition. If unskilled, he is a laboring machine put down here without any outlay from us, which it would cost us nearly or quite \$1500 to construct ourselves. Most of the clamor against immigration, the writer affirms, is raised by those who are alien born, and by their allies who are pandering to the ignorant assumption that the new-comers will take the bread out of the mouths of those already here by depriving them of employment. The trades unions first started it. They refused to allow apprentices to learn the trade lest their monopoly should be broken, and in furtherance of this greed they would prevent, if they could, every foreigner already skilled in any trade or profession from landing on our shores. The truth is that it is the fear that the new-comers will find work, and will take the places of the arrogant, the turbulent and the rebellious who so often refuse to labor except upon conditions fatal to the prosperity of their employers. The present attitude of a large number of workmen is fatal to their usefulness. They are seeking not so much to render good service as to secure the power to regulate all that concerns their employment. They want to issue the orders, and to control the establishments in which they are engaged. They cannot or will not see that they have neither the ability nor experience to take such management into their own hands and make a success of it.

An unusual display of burglars' tools took place at the new rooms of the Jewelers Exchange in the Astor House last week. Even more interesting, though not samples of

metal work, were a number of little dynamite cartridges of the exact strength to blow a safe lock all to pieces without doing any other damage. The articles were found at the rooms of a dangerous burglar, whose headquarters were in Jersey City.

A promised settlement of the cable war will result, it is said, in advancing rates to "a paying basis" of 40 cents a word.

American shipowners, with rare exceptions, find little encouragement in any measures designed for their relief which have been enacted within the last few years either by State Governments or by Congress. Capt. Ambrose Snow, one of the largest shipowners in New York, says: "We know that our shipowners have no other thought with reference to shipping property except to sell it at any price short of giving it away. The only purchasers to be found are the foreigners or lightermen to turn vessels into coal barges. We know that the cost of a ship has no reference to the present position of our condition in this trade. We who own ships regard them as of no value as an investment; the only question with us is, Can we make them pay the cost of running them? Can we keep them from running us in debt?" Captain Snow contends that there is no country in the world where ships—meaning sailing vessels—are as cheap as in the United States, and that the doubtful privilege demanded by "free ship" advocates of going to Europe to purchase more property of a kind which we are unable to use can afford no relief. Congress at its next session will again be asked to pass a law providing for the payment from the United States treasury of "30 cents per ton for each 1000 miles sailed to any vessel, whether sail or steam, built and owned wholly in the United States engaged in the foreign trade." It is computed that the maximum cost of the proposed bounty, allowing every ton now engaged in the foreign trade to sail 25,000 miles per year, would not exceed \$7,000,000 per annum.

Shipments of Canadian cattle to Europe this season have been attended with heavy losses, and the exporters of live cattle from the United States are said to have fared no better, the English market being glutted. Exports from Montreal this season amount to 31,614 head, which is a slight excess compared with last year. At Chicago prices of live cattle have rarely if ever been as low as during this present season. The Chicago *Times* says: "Four years ago, fair to prime beef sold in this market for from 4 to 6 cents per pound. This season only about half this sum is realized for the same grades of animals."

The folly of those workmen who compel manufacturers to remove their establishments from the great industrial centers was freshly illustrated the other day at Bolton, England, where in consequence of a long-continued strike the large firm which it affects was compelled to withdraw from competing with a German firm for an order for machinery in India. This order, which was on the point of being secured to them, would have given employment to 1500 men for six years. But in view of the present strike, and the possibility of being crippled by repeated future strikes, this firm could not see the way clear to proceed.

In the single province of San Paulo, Brazil, the planters received nearly 16,000 European laborers during the first half of the current year, hastening the time when slavery will be wholly abolished in the Empire.

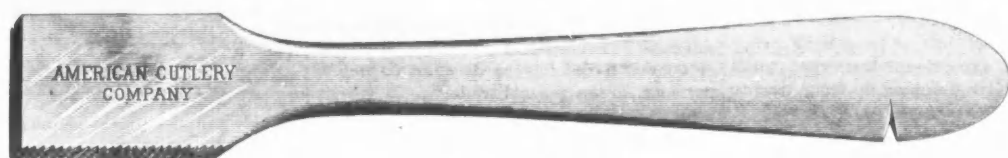
Horace Abbott, one of the best known iron manufacturers in this country, died on the 8th inst. at Baltimore, Md., aged 81 years. He was born in Sudbury, Mass. In early life he was a blacksmith. He went to Baltimore in 1836 and bought the Canton Iron Works from Peter Cooper, of New York. He made the first large steamship shaft of wrought iron in this country. It was for the Russian frigate *Kamschatka*, built for Nicholas I. in New York. It weighed 26,000 pounds, and aroused great interest when placed on public exhibition in the Exchange in New York. He increased his mills until they had the largest capacity of any establishment in the United States. A great feat during the war was in supplying the Government with 250,000 pounds of rolled iron in 48 hours after receiving the order. He supplied Mr. Ericsson with the plates for armor of the first monitor. He supplied the plates for nearly all the vessels of that class built on the Atlantic coast. Mr. Abbott had been retired from active business for some time, and the famous iron mills have gone down because of the costliness of fuel.

Almost incredible quantities of tin foil are used as coverings for tobacco and other forms of merchandise. Two processes are used in reducing the metal to the requisite thickness. The old manner of hammering by hand after first being cut is still used to a great extent. By this process, however, only one surface could be produced, and to obviate this difficulty rolling mills were invented. Prior to their invention nearly all the tin foil was imported, but their use has completely revolutionized the trade. The metal is now placed between two heavy rollers, which gives it a finished surface on both sides. It is then cut into widths of from 12 to 15 inches, rolled upon wooden reels and carried to cutting machines, where it is cut according to order. It is then packed in boxes of 100 pounds each, being laid in without pressure.



**Cigar Box Openers.**

The American Cutlery Company, 177-193 Mather street, Chicago, are manufacturing some new styles of cigar box openers, one of which is shown in the illustration herewith. They are handsomely nickel-plated, and make a very serviceable tool. The notch cut in the blade is for the purpose of

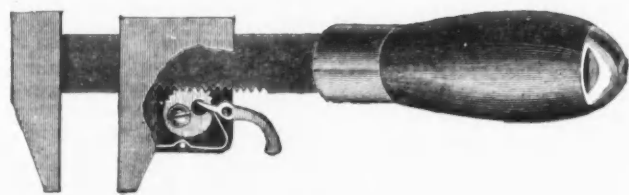


Cigar Box Opener.

drawing the nails. The company will stamp on them the names of jobbers who may desire to use the box openers as an advertising device.

**The Utility Wrench.**

This wrench, which is represented in the accompanying illustration, is manufactured by the Utility Wrench Company, 231 East Ninth street, New York, the factory being on Railroad avenue and Hamilton street, Newark, N. J. It is put on the market after long-continued and careful experiments, in order to present it in a perfected form. The illustration represents it with a portion of the sliding jaw broken away, for the purpose of showing the principle on which it is constructed and its working parts. It will be thus observed that this jaw of the wrench is held in any desired position by the action of a toothed eccentric on the toothed bar of the wrench, this eccentric being lifted from contact with the bar by a projecting lever used in operating it. The teeth on the bar and the eccentric are, however, much finer in the wrench than in the illustration, there being 40 teeth to the inch, thus permitting a very fine and exact adjustment. The point

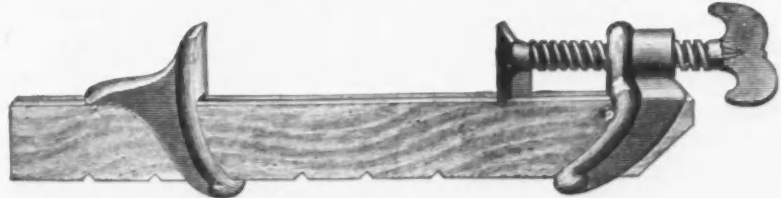


The Utility Wrench.

is also made that the wrench is not held by the teeth, but by the friction produced by the action of the eccentric, and that hence the teeth are not liable to break or to wear out, while at the same time the grip of sliding bar is such as to make it practically a solid wrench. These wrenches are described as made of the best quality of Norway iron and tool-steel forgings, all parts being forged and case hardened. The operation of this wrench is simple, pressure of the thumb on the lever being all that is required in opening it and pressure on the side of the sliding bar readily closing it, bringing it in contact with the nut or the other object to be gripped. Special emphasis is laid on the point that under the greatest strain the sliding jaw will not yield a hair, but remains as firmly fixed as if welded to the bar. These wrenches are made in two grades of finish—A, nickel plated, and B, both having the same construction and quality of material. No. 1 is 4½ inches in length, with a span of 1½ inches; No. 4 is 7 inches in length, with a span of 1½ inches, and No. 7 is 12 inches in length, with a span of 2½ inches. All parts of these wrenches are interchangeable, and the wrenches are put on the market fully warranted.

**New Door Clamp.**

E. C. Stearns & Co., of Syracuse, N. Y., are putting upon the market the new door clamp shown in the accompanying engraving. Of the costly tools required by carpenters and woodworkers the door clamp has been a conspicuous example. Those who



E. C. Stearns &amp; Co.'s New Door Clamp.

have had occasion to buy articles of this kind, and who have, in view of the price generally demanded for them, sought something cheaper, will be interested in the article here illustrated. The clamps are mounted on maplewood 1½ inches x 1½ inches in two lengths 3 and 4 feet respectively. The loose jaw is supplied with a spring that holds it at any point required, and is very easily and simply operated. The stationary jaw at the end of the bar is held in place by a neatly arranged screw. This jaw has a malleable iron thumb-screw with ball and socket joint, making an adjustable washer. This tool would seem to be one to command attention from the trade in general.

**New Tin Shingle.**

The Anglo-American Iron Roofing Company, of Pittsburgh, have recently added to their line of roofing specialties the tin shingle which is illustrated herewith. In its general appearance, so far as shape and the embossed design is concerned, it resembles other goods which this company have on the market. It possesses features unlike the other patterns, however. The shingles are square and are applied diamond shape to the roof. They lay 8 x 8 inches to the weather, and

225 cover a square. The special features to which the makers direct attention include, among others, the parallel corrugations along the upper edge of each shingle and the overlapping panel on the lower edge. The advantages of the two corrugations under the lap will be readily appreciated by practical men. The company point out that they avoid leakage from capillary attraction to which

the eaves of which troughs were hung. The hangers are adapted to be bent and put in place first, and then, after the roof is finished, the trough can be carried up and put in place. The hanger, as already described, fastens at the head. The parts are so strong that the makers say that it is impossible for snow or ice sliding from the roof to bend the trough down. In addition to the use for

by spiral springs, as shown in Fig. 4 of the engravings. The cylinders are fastened to the heads by copper rivets, which give strength to the body and prevent the hubs

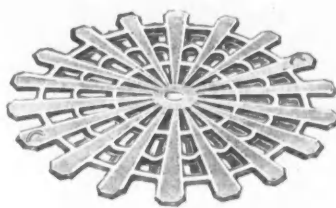


Fig. 2.—Register Plate Detached.

from being turned off from the cylinders. Fig. 1 shows the general appearance of the thimble, with a register plate in position. Fig. 2 shows the register plate detached. Fig. 3 illustrates the ventilator, as constructed for closing the opening in a chimney on removal of the stove-pipe. Fig. 4 is



Fig. 3.—Register Plate as Put in Place for a Stove-Pipe Opening.

a sectional view, and shows details of construction. This, while designed specially for closing the stove-pipe opening, is also adapted for use as a permanent ventilator. The makers state that the Star Thimble here

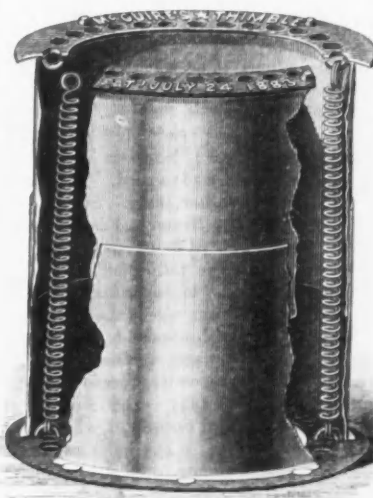


Fig. 4.—Longitudinal Sectional View, Showing the Construction of the Thimble.

illustrated, including the forms of register and ventilator, on account of being thoroughly made, handsomely finished, and being sold at low prices, combine many desirable qualities which are giving it increasing popularity.

**The Latest Customs Decisions.**

The latest monthly decisions in *extenso* affecting iron or its manufactures are as follows:

**IRON CRANK-SHAFTS.**

In rejecting an appeal from 45 per cent. duty on crank-shafts as a manufacture of iron, the department rules:

The appellants claim that the shaft in question is dutiable at the rate of 3½ cents per pound for "steamer, crank and other shafts." The provision of law under which the appellants claim that the crank is dutiable reads as follows: "Steel ingots, cogged ingots, blooms and slabs, by whatever process made; die blocks or blanks, billets and bars, and tapered or beveled bars; bands, hoops, strips and sheets of all gauges and widths; plates of all thicknesses and widths; steamer, crank and other shafts," &c. The department decides that the term "steel" qualifies all the articles mentioned in this provision of law, so far as quoted above, and that iron crank-shafts are not included therein.

**SADDLERY HARDWARE.**

On an appeal from 45 per cent. duty on certain saddlery nails and tools, the Secretary of the Treasury says: "The goods in question consist of 'saddle nails,' 'steeples-chase nails,' 'brace nails,' and of certain tools designated as 'pricking irons,' 'pricking wheels,' and 'saddlery hammers,' all of which were classified as 'manufactures of iron,' and the appellant claims that they are dutiable at the rate of 35 per cent. ad valorem, for 'saddlery, coach, and harness hardware, silver-plated, brass, brass-plated, or covered, common, tinned, burnished, or

japanned.' The term 'saddlery,' as used in said provision of law, appearing to be of doubtful construction, the question of its proper meaning has been submitted to the Solicitor of the Treasury, who states that in his opinion it should be construed not as an adjective, but as a substantive, including saddles and other articles of horse-gear made by a saddler, and materials for making saddles, such as wood, leather, hardware, &c. Under this definition the nails are included and the tools are excluded from classification as 'saddlery.' The nails at the rate of 35 per cent. ad valorem, and the tools at the rate of 45 per cent. ad valorem, as manufactures of iron."

**FORGED IRON BOOKS.**

On an appeal from 45 per cent. duty and a claim of duty as iron forgings at 2½ cents a pound, the department, in affirming the duty, rules: It appears that the articles in question have each a tang and shoulder for a handle, and also a blade, with a notch or slit in the end, the whole being of the form and character of what is commercially known as a "welt awl" or "strip awl," used for stripping welts from harness; after having been forged into its present form it has had a notch or slit cut in the end, and has then been polished. It has therefore been advanced beyond the condition of iron forgings, and is dutiable at the rate assessed T. I. new, 216, and department's decision of September 30, 1886 (Synopsis, 7783).

**LATEST CUSTOMS SYNOPSIS.**

Sheep shears, which had been classified on importation as manufactures of steel, were recently held by the United States Circuit Court for the Eastern District of Missouri to be entitled to entry as "cutlery," and to be dutiable at the rate of 35 per cent. ad valorem. As such decision of the court is in accordance with the recent ruling wherein the United States Attorney-General advised an acquiescence, the department concurred in such decision, and directed a refund of the excessive duties, and also prescribed that future importations of sheep shears should be classified as cutlery, and that the previous ruling of a different tenor be modified accordingly.

Certain small bull's eye lanterns, which upon investigation were found to throw a powerful light for a distance of 30 or 40 feet, and which may be used by riders on bicycles, by housekeepers in cellars, &c., are held to be not toys, as claimed by the importers, but to be dutiable at the rate of 45 per cent. ad valorem, for "manufactures, articles or wares not specially enumerated or provided for in this act, composed wholly or in part of \* \* \* metal," and for "manufactures of glass \* \* \* not specially enumerated or provided for in this act."

Certain taggers iron which has not been cold rolled, but has also been cleaned by some material or process, which is evident from the fact that the surface of the iron is free from scales, is held to be dutiable at the rate of 30 per cent. ad valorem, and in addition to ¼ of 1 cent per pound.

**The Naval War College.**

According to the *Army and Navy Register* the Naval War College will reassemble at Newport on the first Monday in September, and continue in session until late in December. Commander Bainbridge-Hoff will give a digest of contemporary foreign opinions on the subject of naval tactics, both of single ships and of fleets. The tactics of the gun, of the ram and of the torpedo, their best and most effective method of use—that is, in actual battle between opponents or between contending fleets—will be separately treated, each by an officer who will aim at bringing out the strength of his weapon and the weaknesses of the other two. These will be followed by some lectures on grand tactics. The question of naval gunnery will be treated by Lieut. John F. Meigs, whose lectures last year were particularly interesting and instructive. Professor Soley will give his lectures on international law. The subject of coast defenses will be discussed, as last year, by an army and a navy officer. General Abbot, of the army, will aim at giving naval officers an insight and grasp of the general principles which guide the military engineer in planning and constructing the defenses of harbors. The question of sea-coast defenses will be exhaustively discussed from the naval point of view by Lieut. C. G. Calkins, of the Naval Intelligence Office. The subjects of military strategy and tactics and of naval history will be treated by the same officers as last year. Assistant Naval Constructor Gatewood will lecture on the preservation and care of iron ships, and upon the injuries to which they are liable from grounding, collision, &c. Medical Director Dean will lecture on naval hygiene. Lieutenant Commander Stockton is now engaged upon an examination of the way in which the various nations of Europe are stationed in the Gulf of Mexico, the Caribbean Sea, and in the Pacific Ocean, with a view to determining the relative strategic value of these stations. It is intended that the study of the Gulf and Caribbean Sea, regarded as a great strategic field of special importance to the United States from its proximity, and above all, if any trans-isthmian canal shall be made, shall form a prominent part of the War College course. Mr. Stockton will bring together the facts of commerce and existing trade routes between the Western Pacific (Australia, China, &c.) and Europe, together with the modifications likely to follow upon the building of a canal.

Dr. Otto, of Germany, inventor and patentee of the Otto gas engine, has commenced suits in the United States Court for injunction and damages against those making and using the Korting gas engine. Among those sued are Odolph Wittenmann, Geo. F. Sturken, John C. Seaman and Melville C. Thwing, all of New York City.

There are 10,000 to 14,000 men employed at the Woolwich Arsenal, England, which covers 350 acres, exclusive of the dockyards. There are 7 miles of railway. There are 50 chimney stacks, one of them 220 feet high.

slate and other forms of roof are subject. They also prevent high winds from blowing the rain and snow between the shingles, and they serve the additional purpose of stiffening the shingle, and, at the same time, provide for expansion and contraction. These shingles are not intended for flat roofs—but,



New Tin Shingle, Made by the Anglo-American Iron Roofing Company.

the company point out, are adapted for roofs with the ordinary pitch. Each shingle is secured to the roof by four nails, which are so placed that they are covered in laying. The points are held down by a clasp.

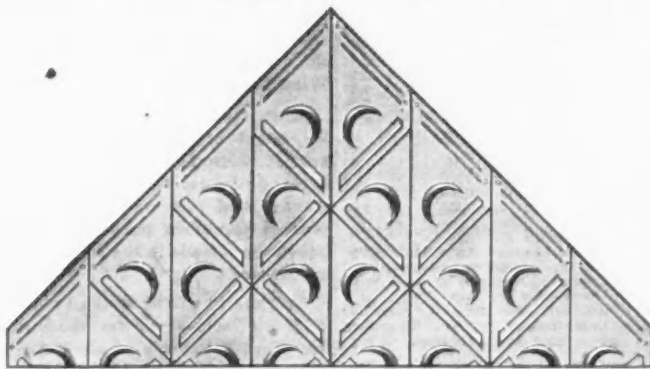
**Tatum's Improved Letter Box.**

The article illustrated herewith is made by Samuel C. Tatum, Cincinnati, Ohio, from new patterns, and is said to be superior in workmanship and design to those previously



Tatum's Improved Letter Box.

on the market. It has unusual capacity inside, and is also provided with a receptacle for papers in its upper lid. Especial care has also been taken to make the box rain-proof. The padlock, being of brass, will not rust, as is the case with the ordinary iron

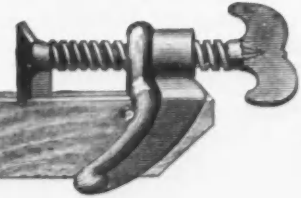


Appearance of Roof Covered with the Anglo-American Iron Roofing Co.'s New Tin Shingle.

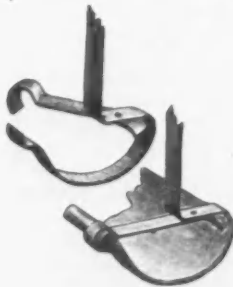
closely against the others, and holding it securely. The shingle here shown is made either of tin or iron, as desired.

**Oatman's Eave-Trough Hanger.**

The accompanying engraving represents a form of adjustable wrought-iron hanger being put upon the market by O. L. Oat-



man, Medina, Ohio. In construction the article is simplicity itself. The hanger, which is adapted for being bent over on to the roof at the right angle, is continued downward and around under the gutter, terminating in the front at the head. To this is fastened, by a single rivet, the horizontal piece which crosses over the top of



Oatman's Eave-Trough Hanger.

the gutter, and which slips on to the bead in a way to complete a lock at that point. In their circular the makers say that they first manufactured this hanger for slate roofs, to

**Adjustable Register and Ventilator.**

Some time since (March 8, 1884) we illustrated and described the McGuire Ventilating Thimble, manufactured by E. C. Stearns & Co., of Syracuse, N. Y. In the interval certain changes and modifications



Adjustable Register and Ventilator.—Fig. 1.—The Device Fitted with Register Plate.

have been made in the construction of the article, which, while not altering its general appearance, have added to its usefulness and have given it a wider range of application. The article consists of cylinder heads fastened together in a way to be adjustable. The drums or shells are made in a form to afford a slip joint, and the heads are held



# Trade Report.

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, AUG. 10, 1887.

**Scotch Pig.**—The market is a little firmer. Scotch warrants are 42/4. Makers' brands are quoted as under:

Cathness, alongside, Glasgow	54/
Langloan	50/
Glenarnock	49/
Gartsherrie	48/6
Shotts	48/
Dalmellington	47/
Carnbroe	44/
Eghinton	43/
Summerlee	41/6
Carriage from Ardrossan to Glasgow is 1/2 ton.	

**Bessemer Pig.**—The market is unchanged. We quote W. C. Hematites, Nos. 1, 2 and 3, 44/ @ 45/.

**Cleveland Pig.**—The market is firmer, at the following prices: 37/ for No. 1 Foundry; 36/ for No. 2; 35/ for No. 3, and 34/ for No. 4 Forge.

**Bessemer Billets.**—Bessemer Billets, 2 1/2 x 2 1/2 inches, are higher at 80/ @ 85/.

**Bessemer Crop Ends.**—We quote run of mill 52/6 @ 54/6.

**Manufactured Iron.**—The market is unchanged. We quote:

Staff, Ord. Marked Bars	6 0 0 @ 6 10 0
Medium	5 0 0 @ 5 10 0
Common	4 15 0 @ 5 0 0

Hoops, 20 W. G. and over	5 0 0 @ 6 0 0
Common Best	5 0 0 @ 6 0 0
Medium	5 0 0 @ 6 10 0
Common	5 0 0 @ 6 10 0

Sheets, 20 W. G. and under	6 5 0 @ 6 15 0
Ordinary Best	5 10 0 @ 6 0 0
Common	5 10 0 @ 6 0 0

Welsh Bars are quoted £4. 2/6 @ £4. 5/.

**Steel Rails.**—The market is unchanged, with quotations at £4. 2/6 @ £4. 7/6.

**Scrap.**—Is weaker. We quote 50/ @ 52/6 for Heavy Wrought, c.i.f. New York.

**Copper.**—The market is unchanged, Chili Bars closing £40. @ £40. 5/, and Best Selected £45. @ £45. 10/.

**Tin.**—The market is a little weaker, with spot at £104 10/ @ £104. 15/, and futures at £104 @ £104. 10/.

**Tin Plates.**—The market is unchanged. We quote:

Tin Plates, 10x14, 1st qual. Charcoal	17 @ 18
" " " " " "	16 @ 18
" " " " " "	14/6 @ 15/6
" " " " " "	13/8 @ 13/8

**Lead.**—We quote Common English £12. 7/6.

## Financial.

Office of The Iron Age.

WEDNESDAY EVENING, AUGUST 10, 1887.

The financial atmosphere has perceptibly cleared since the announcement by the Treasury that the Government would prepay interest on the 4 1/2 % bonds, and purchase its 4 1/2 % falling due 1891, and further relief was given by the collapse of the California wheat deal, which, like that in Chicago, was known to threaten disaster. In some respects the markets responded in a renewed confidence and quickened pulsation. On the other hand, a check was received from an unfavorable bank statement, showing a loss of \$1,208,425 in surplus reserve, which now stands at \$6,922,650. In legal requirements there was a reduction of \$636,075, in consequence of a decline of \$2,544,300 in deposits. Loans showed an expansion of \$812,700, thus reflecting in part the easier condition of the money market. Sub-Treasury operations were a source of loss to the banks, and the course of domestic exchange continues against this city. Secretary Fairchild, in explanation of his action, said the anticipation of interest on the public debt is one of the two means given to the Secretary of the Treasury for disposing of the surplus funds, and he regarded it as the cheapest and most advantageous. The interest covered by the circular amounts to \$22,319,784. The sinking fund requirements will amount to about \$26,000,000 in addition to the \$20,000,000 of 3 % bonds already applied to that fund. Under the terms of the circular of August 3, the Treasurer to-day received tenders of bonds to the amount of \$5,462,000 at prices varying from 1/2 below to 3/4 above current quotations.

The Stock Exchange markets have been active and generally strong. On Thursday there was a boom on the announcement of the Government's offer to prepay interest and purchase bonds, and on Friday and Saturday the market was variable, but less active. From London generally higher prices were reported. Rumors were current that the Cincinnati, Hamilton and Dayton Railroad would be put under a new management, and the offering of the stock down to 90 was the subject of much comment. On Saturday a raid followed the unfavorable bank statement. On Monday the tone was weak and feverish, speculation dull. One feature in the final dealings was a sale of Cincinnati, Hamilton and Dayton at 40, against 135 the last previous sale. On Tuesday a sharp rally followed the news that Ives and Stainer had resigned as president and vice-president of the C. H. and D., and that a committee would examine the accounts. To-day stocks were remarkably strong, closing as follows: Del., Lack. and Western, 130 1/2; Erie, 30 1/2; do. preferred, 69 1/2; Lake Shore 94 1/2; Lake Erie and Western preferred, 53 1/2; Louisville and Nashville, 62 1/2; Michigan Central, 85; New York and

New England, 44 1/2; New Jersey Central, 75; Northwestern, 115; Northern Pacific, 30; Oregon Transcontinental, 27 1/2; Ontario and Western, 16 3/4; Pacific Mail, 40; Reading A. P., 55 1/2; Richmond and West Point, 28 1/2; St. Paul, 82 1/2; St. Paul and Duluth, 79 1/2; Union Pacific, 56 1/2; Western Union Telegraph, 74 1/2; Delaware and Hudson, 100 1/2; Manhattan, 111.

United States bonds closed as follows:

U. S. 4 1/2, 1891, coupon	110 1/2 @ 110 1/2
U. S. 4 1/2, 1897, coupon	107 3/4 @ 107 3/4
U. S. Currency 6s, 1895	123 @
U. S. Currency 6s, 1896	125 @
U. S. Currency 6s, 1897	126 @
U. S. Currency 6s, 1898	131 @
U. S. Currency 6s, 1899	133 1/2 @

Bar silver in London is 44 1/2 d. ounce. New York price, 95 1/2. Bullion certificates, 95 1/2 @ 96 1/2.

Money is now offered more freely on call, and loan brokers report that increased amounts are available for time loans, but the banks are doing little with commercial paper. We quote 60 @ 90 days indorsed bills, 6 %; longer dates 6 1/2 @ 8 %. In Boston prospects are considered rather more hopeful. In Chicago, reports of damage to the corn crop are making a decided impression on local trade, modifying the estimates of future possible sales of goods in the sections tributary to that market, but money is not greatly influenced. In St. Louis, barring the demands of wheat dealers, requirements are light. In San Francisco, losses by the wheat deal are estimated at \$6,000,000, but full information is not yet obtainable, particularly as to the position of the Nevada Bank. The advance of 1 % in the Bank of England rate weakened long sterling, and drawers reduced their posted rates to 4 1/2 %. According to the custom-house report the exports of specie from this port last week were \$110,000, and the imports \$142,294, making the total since January 1 \$11,290,813, and \$8,477,212 respectively, against \$13,000,000 and \$6,453,000 for the corresponding period in 1886.

The bank clearings of 36 cities last week show a handsome gain over 1886, the increase being 20.3 %, outside of New York 11.9 %. Only five cities show a decrease. There is likewise a gain compared with the previous week. The augmented volume of stock transactions accounts in part at least, for a rise of 2.4 % in New York.

The merchandise markets reflect in some degree the easier condition of money, but are generally quiet. In dry goods the jobbing trade is active here and at interior markets. The grain markets were all affected by the collapse in California, as there are large holdings in Liverpool on account of the San Francisco clique, to be sold by banks which advanced on shipments. Corn is firmer under unfavorable crop reports. Coffee has an easier tendency; trade dull. Cotton is one sixteenth lower; hemp is active, and prices of manilla are advanced. India Rubber is quiet. Leather firm. Sugar quiet and firm. Tobacco firmer. For ocean tonnage there is a limited demand.

There was a large falling-off in the exports of produce and merchandise from the port of New York last week, the total being \$5,588,588. Since January 1, the exports amount to \$181,915,545, against \$191,747,852 for the corresponding period in 1886, and \$201,978,496 in 1885. The items for the week include 736,416 bushels of wheat, 254,168 bushels of corn, 8,452 bales of cotton, 8,620,050 gallons of petroleum, and 4,129,513 lb cut meats. The imports of merchandise at this port last week were valued at \$9,164,000, including nearly \$2,600,000 in dry goods, making a total since January 1 of \$281,560,000 as compared with \$259,343,000 for the same time in 1886, and \$233,113,000 in 1885.

The rich coal and iron ore fields of East Tennessee, which have long been neglected, seem to be now on a fair way to early development. No less than four railroads are mentioned as about to penetrate this attractive section of the State. The Tennessee Midland is to run from Memphis to Bristol via Nashville; the Knoxville Southern, from Knoxville to a point on the State line between Tennessee and North Carolina; the Cincinnati and Birmingham, from Somerset Ky., to Birmingham, and the Powell's Valley, from Knoxville to Cumberland Gap. On the Knoxville Southern there are immense deposits of brown hematite ores from Tellico to the Hiwassee Gap, and from the latter place to Murphy great beds of iron ore, mica, slate, copper and manganese are found. The road will tap the Ducktown copper country, and is everywhere within access of fine forests. Connections will be made with the Marietta and North Georgia Railroad. The company promise to build the road and have it in operation within two years. The Powell's Valley tap iron ore deposits and timber belts and extend to the Cumberland Gap coal fields. An association of capitalists interested in this road intend to supply coke to Southern furnaces.

An official note has been published on the great bell for the Cathedral of Cologne, Germany, the solemn inauguration of which took place a short time ago with great pomp. The bell weighs 27,000 kg., or about 26 tons 13 cwt. The clapper alone weighs 800 kg., or nearly 15 1/2 cwt. Its perpendicular height is almost 14 1/2 feet; its diameter at the mouth nearly 11 1/2 feet. Twenty-two cannon taken from the French were assigned by the Emperor William for its manufacture; 5000 kg. of tin were added. It was cast by Andreas Hamm, of Frankenthal, and 21,000 marks (\$1050) were paid for the casting. It will be known as the Kaiser's bell, or Emperor's bell, and, as the two other large bells in the cathedral bear the epithets respectively of Pretiosa (precious) and Speciosa (beautiful), this one is styled Gloriosa.

## General Hardware.

Business continues good. Sales have been and are large, and a confident and cheerful feeling prevails in all parts of the country. Changes in price are few.

### NAILS.

The New York market has been moderately active, and is steady, concessions from \$2.10 for carload lots of Iron Nails being made only in exceptional instances, small lots of cheap Nails cropping up from time to time.

It is reported that arrangements have been perfected, or are nearly so, to provide for an allotment and restriction of product in the Western Nail trade. The total quantity to be made during the current year is to be based upon last year's sales, deducting 5 per cent. in order to be safely within the limits of the demand. The quantity so reached is to be distributed among the different manufacturers, according to the number of machines they have, the manufacturers being allowed to make their quota at any time during the year. A penalty of \$1 per keg is to be paid for any excess over the allotment of the individual firms, inspectors, &c., being appointed to see that the agreement is carried out. We understand that one selling agent is to be appointed who is to handle all the sales, and that no manufacturer is allowed to sell less than carload lots. The Western Nail Association have also put forward a proposition to change the Nail card, the one now issued but not finally adopted being a compromise of two different propositions recently discussed. The following is the scale of extras referred to:

Fence Nails and Brads	Old.	Proposed new.
600d	Base.	Base.
Fence Nails and Brads, 16d.	Base.	\$0.10
" " " " " "	Base.	.20
" " " " " "	Base.	.30
" " " " " "	Base.	.40
" " " " " "	Base.	.50
" " " " " "	Base.	.60
" " " " " "	Base.	.75
" " " " " "	Base.	1.00
" " " " " "	Base.	1.25
" " " " " "	Base.	1.50
" " " " " "	Base.	2.00
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" " " " " "	Base.	3.00
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" " " " " "	Base.	4.00
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This list, we understand, is the latest proposals as formulated by the Western Nail Association. On Thursday of this week the Eastern Nail Association holds its meeting in Philadelphia to discuss the question of a pool, its committee appointed for that purpose being ready to report. It is understood that the plan, which of course, is subject to modifications after discussion at the meeting, differs somewhat from that considered in the West, since the conditions in the different sections are far from identical. It is stated that the two associations will reach some agreement among themselves, the basis of which is supposed to be that, while full liberty is given to sell in one another's territory, it is to be understood that Eastern manufacturers will not undertake to cut prices in the West, or Western manufacturers use the Eastern market to force off any surplus as has been done in the past. Those who are identified with the pool movement speak of it hopefully. Until the trade is fully acquainted with all its details it will, however, accept the possibility of the pools being carried through with some reserve. It is certain that some of the features of the Western plan will not be adopted in the East.

While the New York market for Barb Wire continues moderately active at unchanged prices, advices from the West show growing strength and higher figures. We quote 4.10 cents to 4.12 1/2 cents







## AUGUST 10, 1887.

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**Casters.**  
Bed.....  
Plate.....





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# Trade Report.

## NEW YORK.

**American Pig.**—The trade continues to move along in very much the same lines that it has followed for so long a time. Sales are moderate, lots of 500 tons coming up occasionally, with nothing reported beyond that in size. The scarcity of good brands of No. 1 Foundry is such that occasionally as much as \$22 is paid, and for some brands it is impossible to obtain any quantity, however moderate, in the open market. Consumers, however, are not buying ahead, but seem to be willing to take their chances on the market. Southern Irons are practically out of the market, even Silvery Bright, which is taken in some quantity by stove manufacturers, being hardly available. For Gray Forge a number of inquiries for moderate lots have come into the market, and the feeling is a little better in consequence. We quote No. 1 Foundry, \$21 @ \$22; No. 2, \$19.50 @ \$20.50, and Gray Forge, \$17.50 @ \$18; Southern Irons are quoted \$20.50 @ \$21 for No. 1 and \$18 @ \$19 for Silvery Bright, according to quality, which varies widely.

**Scotch Pig.**—Sales continue on a moderate scale, but are large enough to absorb current importations, and considerable iron is booked for the near future. We quote: Coltness, \$22.50 @ \$22.75; Glengarnock, \$20.75 @ \$21.25; Gartsherrie, \$21 @ \$21.25; Summerlee, \$22 @ \$22.25; Dalzell, \$20.50 @ \$21; Clyde, \$20.50 @ \$21; Eglinton, \$20 @ \$20.50.

**Spiegel and Bessemer Pig.**—We hear of a sale during the week of 5000 tons of English 20 % Spiegel at \$26.25 ex ship. Sellers are now asking higher prices, ranging between \$26.50 and \$27.25 for English and German Spiegel. No business is reported in Bessemer Pig. Foreign is nominally quoted \$20.25 @ \$20.50.

**Bar Iron.**—While the makers of good brands are fully supplied with orders and find some difficulty in keeping up with the demand, the producers of inferior grades find it difficult to market their entire product, and continue to make concessions. We quote Common, 1.85¢ @ 1.9¢; Medium, 1.9¢ @ 1.95¢, and Refined, 1.95¢ @ 2.25¢, on dock, for round lots.

**Structural Iron.**—There is considerable large business in sight, and the market remains firm. We quote for large quantities: Angles, 2.45¢ @ 2.60¢; T's, 2.75¢ @ 2.80¢, and Channels and Beams, 3.30¢, base on dock.

**Plates.**—In some quarters a slight relapse is noted, some makers being more willing to take orders. We quote Common or Tank, 2.40¢ @ 2.50¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.65¢ @ 2.90¢; Flange, 3.50¢ @ 3.75¢; Extra Flange, 4.25¢ @ 4.50¢. For Steel Plates quotations are as follows: Tank, 2.75¢ @ 2.9¢; Ship, 2.9¢ @ 3¢; Shell, 3¢ @ 3.25¢; Flange, 3.3¢ @ 3.5¢, and Fire-Box, 3.3¢ @ 4¢, on dock.

**Steel Rails.**—No business of any consequence is reported during the current week, and some of the inquiries so repeatedly referred to have not yet assumed any definite shape. One of the prospective large orders is that of the Missouri Pacific system, which it is reported will call for at least 35,000 tons, and possibly 50,000 tons for winter delivery. One point is dwelt upon as giving promise of overcoming to some extent the trouble experienced annually in filling order books for winter work. A number of the railroads have reached the conclusion that it is good economy to have their rails ready for distribution along their lines before the frost is out of the ground, so that repairs and renewals can be made at once, and not piecemeal during the early summer months, as is generally the custom now. This, it is urged, will lead to forestalling of some of the demand, and will tend to carry a little more of the work into the winter months. It has been usual for the larger and stronger roads to place their orders during this time of the year, when concessions have generally been obtained. We quote \$38.50 @ \$39 for early delivery, \$38 for fall and \$37 @ \$37.50 for winter delivery, with buyers' views generally below the latter figure.

**Billets and Blooms.**—Only a small business is reported in this market, but rumors from England have it that large purchases have been made there for American account. Since in the West Domestic Billets control the situation, and in the East the largest buyers are supplied, it is some what difficult to accept the reports made.

**W. R. Rods.**—Some business has been done, and there is an inquiry for 5000 tons in the market now. From abroad it is reported that very heavy sales have been made during the past three weeks for American account, the bulk probably by importers, in anticipation of the demand here. It has put prices up there from \$5.50 to \$5.10 @ \$5.11. We quote here, for early delivery, \$41 @ \$41.50.

**Railroad Fastenings.**—We quote Spikes \$2.45 @ \$2.50.

**Old Rails.**—The deadlock continues, buyers and sellers being far apart. It is reported that a number of sales have been made by the representative of a foreign house to importers at 70¢, c.i.f., and there are rumors of a sale of 1000 tons of Doubles, shipment, at \$25 taken by a consumer.

Holders ask \$24 for Tees and \$25 for Doubles. Abroad 69/6 has been offered for T's, without finding takers.

M. Frankfort, of 27 William street, this city, representative of J. Kogel & Co., Amsterdam, Holland, has compiled and published a very handy table showing the equivalent in currency of c.i.f. sterling prices on old materials, providing for per cent. loss of weight, per cent. bank commission and the duty.

## Metal Market.

**Copper.**—On the 4th a fire broke out on the 16th level, near No. 2 Hecla Shaft, and all of the openings of the Calumet and Hecla mine proper, have been sealed, thus cutting off the most productive ground, that yielding rock highest in Copper and best equipped with machinery. The company, however, have developed what is practically a second mine, in the Black Hills territory, separated from the Calumet and Hecla production ground by a long stretch of barren country. The two mines are connected by only one drift, which has been sealed so that the Black Hills mines is completely isolated. The rock in this part of the property does not, however, carry more than 3 % of Copper as compared with 4.5 % in the part now closed down, nor is the Black Hills mine equipment capable of keeping the stamp mills even approximately busy. It may be questioned whether it can be relied upon to yield monthly more than 1,500,000 to 1,750,000 lb of Copper, as compared with 4,000,000 lb of Ingot, which is the average monthly product of the company. According to the latest advices the ground in the vicinity of Hecla No. 2 is not as hot as it has been, and smoke issuing from that shaft, only steam and carbonic acid are being driven into the mines. In all its contracts the company has clauses saving it from responsibility for delivery of contracts during such emergencies, but we are informed by its representative that their deliveries will be made, although it may be doubted whether, should the mine be closed for a long time, the supply would be adequate for the last months of current contracts. As to the time which it may take before the mine can be reopened, the naming of any period is simply wild guess work. At all events this disaster should cause the small consumers in particular to be vigilant to supply themselves in the open market ere the larger consumers and operators have absorbed what there is to be had. In any other branch of business the cutting off of supplies similar to these would instantly have caused a great advance in price. There certainly are signs since yesterday of both dealers and consumers having been aroused into action, over 500,000 lb of Copper having been taken from second hands at 10.55¢ for August and September delivery, and at 10.65¢ for October. At these figures there are buyers still, but sellers are shy, some anticipating an early advance to between 11¢ and 12¢. Export of Pyrites from Spain during the first five months, 333,431 tons, against 300,562 in 1886, and 342,265 in 1885; of Precipitate, 11,696 tons, against 10,660 in 1886, and 11,688 in 1885. Export of Ingot Copper from the United States during the last fiscal year, 19,580,923 pounds, against 24,239,258 in 1886. Best Selected remains £45 in London, Chili Bars not wavering from £40 all the time.

**Tin.**—There has been a very dull and uninteresting market in Tin. On the spot prices are fully maintained, owing to small supplies and increasing demands from consumers, 23.55¢ and 23.50¢ having been accepted for available parcels on dock, but dealers are holding firmly at 23.5¢ for 5 to 10 ton lots from warehouse. Futures have been dealt in to a small extent at 23.4¢ August, 22.95¢ September and 22.85¢ October. The London market has been quite stagnant lately, but dropped to day 10/ 7/ 10 to £104. 2/6 spot and £103. 12/6 futures, being about equal to 23.5¢ laid down here for spot delivery, thus leaving a loss to importers in bringing over fresh supplies. At noon a cablegram quotes spot Tin £103. 15/1 and three months £103. 5/1. There changed hands at the Metal Exchange at the first call 20 tons October Tin at 22.4¢ and 10 tons November at 22.70¢. Net import of Tin into the United States during the last fiscal year, 13,180 tons, against 12,422 in 1886. **Tin Plates.**—The demand continues moderate, but with the low stocks held by dealers they are able to command very full prices. Arrivals during the week have gone mainly to consumers on old contracts. Makers are still very much behind in their deliveries. In Wales they have had a week's rain but it has all been imbibed by the parched soil, furnishing no water for factory purposes at latest dates. We quote at the close, large lines, per box: Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5; ditto Coke Finish, \$4.65; Terns, \$4.30, and Coke Tins, \$4.45 @ \$4.60. Coke is cabled from Liverpool 13/6, and Charcoal, 16/ @ 17/. Net import of Tin Plates into the United States during the last fiscal year, 254,980 tons, against 254,656 in 1886. Export from England during the first six months to all quarters, 176,138 tons, against 181,994 in 1886, and 153,257 in 1885; to the United States alone, 135,310, against 148,388 and 115,861; to British North America, 8470, against 5643 and 6371. Average price of Coke Tin, 12/9, against 13/3 1/2 and 13/4.

**Lead.**—Sales during the week amounted to 200 tons Selby, to be shipped the middle of August, and delivery to be made the end of August at \$4.55, and 200 tons in lots at \$4.60, the closing figure being \$4.55 @ \$4.60. Lead is very scarce in the West, and sold at St. Louis at a quantity of \$4 72 1/2, at New York and at Chicago, 50 tons at 4 3/4¢. Exports of Pig Lead from Spain during the first five months, 56,051 tons, against 46,977 in 1886, and 51,235 in 1885. In London there has been a decline of 2/6 all around, Soft Spanish giving way to £12 and English Pig to £12. 5/. Manufacturers of Lead may be quoted in this city as follows: Pipe, 7¢; Sheet 7 3/4¢; Tin Lined Lead Pipe, 15¢; Black Tin Pipe, 40¢; Drop Shot, \$1.40; ditto, 5 lb, 33¢; Buck and Chilled, \$1.65; ditto, 5 lb, 38¢, all less the usual trade discount.

**Spelter and Zinc.**—Common Domestic is quiet at \$4.55 and Silesian at \$4.85, the latter remaining steady in London at £14. 12/6. We quote Bertha Refined 7 3/4¢ @ 8¢, as to quantity. **Sheet Zinc.**—A fair demand prevails, filled at 6 1/4¢ @ 6 1/2¢, Domestic. Export of Calamine from Spain during the first five months 14,129 tons, against 16,522 in 1886, and 17,114 in 1885.

**Antimony.**—Is in fair jobbing demand at 9 1/4¢ Cookson, and 8 5/8¢ Hallett, the latter recovering in London from £35 to £36.

## New York Metal Exchange.

The following sales are reported:

THURSDAY, August 4.	
25,000 lb Lake Copper, August.....	10.45¢
25,000 lb Lake Copper, September.....	10.55¢
FRIDAY, August 5.	
25,000 lb Lake Copper, September.....	10.55¢
25,000 lb Lake Copper, October.....	10.65¢
WEDNESDAY, August 10.	
20 tons Tin, October.....	22.75¢
10 tons Tin, November.....	22.70¢

## Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, August 9, 1887.

**Pig Iron.**—The market shows very little change from last week. The demand is large, and prices from steady to firm, according to class of iron required. Foundry Irons, as a rule, are scarce, No. 1 especially so, and, as a natural consequence, is held at full quotations. Mill Irons, and some brands of No. 2, can be had at slight concessions, but there is no general weakness. Owing to the extreme heat during the past few weeks, there was less No. 1 made than usual, and for the same reason there were less Mill Irons used, so that there is somewhat of a disproportion in the supply of the various grades. But this will doubtless be remedied with the advent of cooler weather. Meanwhile, some of the larger buyers have reduced their bids to \$17, delivered, for Gray Forge, but there is no disposition to accept less than \$17.50 for good brands, while some are asking a little more than that. No material change in price is expected, however, the heavy production and equally heavy consumption being likely to balance each other for the present. Foundry Irons are selling at from \$21 to \$22 for No. 1, and \$19 to \$19.50 for No. 2, very little good No. 1 being available at less than \$21.50. The supply of good iron is so light, and the demand so urgent that the chance of lower prices in Foundry Irons is not very probable at present, although sellers are not inclined to put them much higher, even if there was a fair chance of success. Foreign markets are so near to our own that a very small trifle of a decline there, or an advance here, would soon let in a large quantity of foreign material, and to avoid this, large orders would doubtless be taken for forward delivery at current rates.

**Foreign Iron.**—Nothing doing, prices nominal at from \$20 to \$22.25 for Bessemer, and \$26.50 to \$27 for 20 % Spiegel. Sale of several thousand tons Spiegel is mentioned at \$26.75.

**Blooms.**—Not much disposition to do business at the rates asked, which for Foreign Steel Blooms are about as follows: Rail Blooms, \$29 @ \$30; Nail Slabs, \$30 @ \$31; Sheet Iron Billets, \$32 @ \$34. Domestic in fair demand, with sales chiefly at the following quotations: Charcoal, \$45 @ \$46; Scrap Blooms, \$35 @ \$39 1/2 "bloom" ton. P. S.—Bids for Nail Slabs have been made at \$29.50, c.i.f., duty paid. Sales at a slightly higher figure not improbable.

**Muck Bars.**—Demand light and prices somewhat irregular, with sales at \$31, at mill, and for near by deliveries \$31.50. Buyers have reduced their limits, and talk at least 50¢ 7/10 ton less.

**Bar Iron.**—There is a good demand for Bars, and as mills are very much behind with their deliveries it is difficult to place new business. The output during July was so extremely small, that it will take some time to catch up, and, with prospects of an unusually heavy consumption, it seems certain that there will be plenty of work during the remainder of the year. Skelp Iron is beginning to move a little also, sales of about 1000 tons having been made during the past few days, with more wanted if prices can be agreed upon. Buyers talk about 1.9¢ for Grooved, and 2.15¢ for Sheared, but sales were at 1.95¢, and 2.2¢ @ 2.25¢. Bars are firmly held at 2 1/2¢ for Best Refined Iron, although some parties are still accepting 2¢ for what is considered good iron.

**Plate and Tank Iron.**—There is quite a scarcity of Plates for early delivery, and

some of the mills are very much behind. The suspension of work during July was more protracted than usual, the effect of which will probably be felt all through the season. With cooler weather, however, and repairs all completed, a larger output is expected, all of which will doubtless be required at quoted rates, which are about as follows: Ordinary Plate, 2.30¢ @ 2.35¢; Tank, 2.40¢ @ 2.45¢; Shell, 2.6¢ @ 2.7¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank, 2.8¢; Shell, 3¢ @ 3.2¢; Flange, 3.3¢ @ 3.4¢; Fire-Box, 3.3¢ @ 4¢.

**Structural Iron.**—Continued activity is reported in this department. The mills are full of work and pressed for deliveries, which they find it impossible to make as promptly as required. New business is also looming up in large proportions, so that prices are not only firm, but orders hard to place at any price. Ordinarily quotations are about as follows (but look like going higher if the demand continues): 2.4¢ @ 2.5¢ for Bridge Plate; 2.30¢ @ 2.4¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

**Sheet Iron.**—The demand for Thin Sheets is still somewhat lighter than was expected, and, although the current output is readily absorbed, orders for forward delivery have not accumulated to any extent. Prices are firm at about the following quotations for small lots:

Best Refined, Nos. 26, 27 and 28.....	3 1/2¢
Best Refined, Nos. 18 to 25.....	3 1/4¢
Common, 4¢ less than the above.....	4 1/2¢ @ 4 3/4¢
Best Bloom Sheets, Nos. 26 to 28.....	4 1/2¢ @ 4 3/4¢
Best Bloom Sheets, Nos. 22 to 25.....	4 1/4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 16 to 21.....	3 1/2¢ @ 3 3/4¢
Blue Annealed.....	2.8¢ @ 3¢
Best Bloom, Galvanized, discount.....	60¢
Common, discount.....	65¢

**Steel Rails.**—There is not a great deal of business doing at present, consumers having arranged for most of what will be required for the balance of the year. Small lots are called for once in a while, but the mills are full of work and not in a position to make very prompt deliveries, for which about \$39 at mill is quoted. Winter and spring deliveries are nominally \$37.50 @ \$38, but there is not much demand in the meantime, although a large business is expected as soon as prices are definitely settled.

**Old Rails.**—Prices are still irregular and unsettled, but on the whole are dearer. Sales have been made at \$24. f. o. b. cars, with bids at \$24 @ \$24.50 for early deliveries. One choice lot of Tees in store could have been sold at \$25, f. o. b. cars, but they are not on the market at present. Rails are in strong hands, and very few offered for sale at current rates.

**Scrap Iron.**—There is a better inquiry, and sales at quoted rates are easier than they were a week ago. A cargo lot sold at \$21.75, and ordinary quotations are about as follows: No. 1 Scrap, \$21 @ \$22; small lots, tide-water delivery, \$22 @ \$22.50; Selected do., \$23; No. 2 do., \$16 @ \$17; Turnings, \$15 @ \$16; Old Car-Wheels, \$17.50 @ \$18.50; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ \$17; do. Borings, \$12 @ \$13; Old Fish Plates, \$27.50 @ \$28.

**Wrought-Iron Pipe.**—Business in this department is improving, and the prospect for a large fall trade is very bright. Prices are quoted with more firmness than for some time. Discounts are as follows: Lap-Welded Black, 50 %; Lap-Welded Galvanized, 32 1/2 %; Butt-Welded Black, 32 1/2 %; Butt-Welded Galvanized, 22 1/2 %; Boiler Tubes, 42 1/2 %.

**Nails.**—Trade is dull and price about the same as last quoted—viz., \$2.25 from store, which has become a general quotation, and, as far as can be ascertained, is being well maintained. Carload lots command \$2.05, f. o. b. cars at mill, and it is doubtful if less than this would be accepted. Taking everything into consideration, the market seems in a fair way to improve between now and the middle of September, provided nothing unforeseen happens.

## Chicago.

Office of The Iron Age, 95 and 97 Washington St., CHICAGO, August 8, 1887.

The tone of the local iron market is excellent with regard to almost everything. Prices are firmly maintained with slight exceptions, and an upward tendency is quite marked in many lines. The long drought that has prevailed throughout the West and Northwest, taken in connection with the exceptionally low price of wheat, causes some misgivings as to the future, but thus far neither the demand nor prices have been unfavorably affected by these causes.

**Pig Iron.**—Business continues active, with a specially strong demand for early deliveries. If the iron could be had for immediate shipment a great deal more could be sold. Orders are still being entered for the season's supply by large consumers, and they are almost always for increased quantities as compared with the contracts placed last year. The consumption is thus indicated to be above that of the past season, and it is expected to keep pace with the production. Even the Coke furnaces now resuming operations are not relieving the scarcity as yet, because so many of them have old contracts unfilled which take precedence of new business. Orders have recently been placed abroad for Bessemer Pig Iron, which it has been found can be imported here at a price slightly under that asked by domestic makers. Prices of some brands are 50¢ dearer than they were last week, but in

general values remain as they were, namely, for cash, f. o. b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$23 @ \$23.50; Southern Cold Blast Charcoal, \$28; Hanging Rock and Jackson County Softeners, \$22 @ \$23; Straight Coke Foundry, No. 1, \$22.50 @ \$23; No. 2, \$21.50; No. 3, \$20.50; Coke Bessemer, run of furnace, \$22.50 @ \$23; Southern Coke, No. 1, \$22.50; No. 2, \$22; No. 3, \$21; Virginia Coke No. 1, \$22 @ \$23; No. 2, \$21.50; Tennessee Charcoal, No. 1, \$23; No. 2, \$22.

**Bar Iron.**—A fair demand is reported by manufacturers' agents. Some sales of consequence have been booked, but inquiries have been made for prices on larger lots which have not yet been placed. The mills are a summing a much firmer position, some of the most persistent sellers now refusing to name prices for future delivery. Common Bars, not guaranteed, are still quoted at 2¢ in carload lots, f. o. b. Chicago. Store sales are satisfactory in volume at 2 1/2¢ @ 2.3¢, according to quantity and quality.

**Structural Iron.**—More inquiry is noted for iron for bridge work, but the mills are now so crowded with business that they are indifferent about taking new orders. Angles are a little dearer, being now quoted at 2.65¢, f. o. b. Chicago, in carloads, and 2.70¢ in less than carloads. Sheared and Universal Plates are also higher, commanding 2.70¢ @ 2.75¢, f. o. b. Chicago. Tees are quoted at 2.90 @ 2.95¢, same terms. Beams and Channels are held at the combination price, but are very hard to get.

**Plates.**—Some good orders for Tank have been entered in the past few days, and more are under negotiation. Prices range from 2.50¢ to 2.55¢, f. o. b. Chicago, in carload lots. The stores report a good demand, the month opening very promisingly. Prices have been advanced on Nos. 10 to 14 Sheet to 2.9¢, and Tank Iron to 2.8¢. Other store prices are unchanged.

**Sheet Iron.**—The demand on manufacturers is unabated, and it is difficult to accumulate any stock, especially of light sizes. No. 27 Common is held at about 3.25¢, f. o. b. Chicago, in carload lots, and at 3.5¢ in small lots from store.

**Galvanized Iron.**—Sales continue very heavy by manufacturers' agents and jobbers, but prices continue as before, although a stiffening tendency is manifested which merely provokes surprise that it had not occurred long ago.

**Merchant Steel.**—Miscellaneous shapes are in active demand and large orders have been booked for season's delivery at higher prices than those named last year. Manufacturers are again making prices f. o. b. at works, leaving buyers to take the risks of freight rates. So many orders have now been taken that manufacturers feel independent, and it is not unusual for them to refuse to consider undesirable specifications. Manufacturers of Fine Steel report a fair trade, but with no special feature, except a slight weakness in Machinery, which is now quoted at 2.6¢ @ 3¢, but has been sold even lower.

**Steel Rails.**—The price fixed by the local mills for the remainder of this year is \$42 for first quality standard sections. For next year's delivery no definite figure is named, but it is not likely that contracts will be made as low as they were a year ago by several dollars per ton. Business is quiet at present, few new orders being in the market.

**Old Rails and Wheels.**—No transactions, except in small lots, have been reported. An offer of \$25.50 is stated to have been made for some Old Rails and refused, while \$22.25 was accepted for a small lot of Car Wheels.

**Scrap Iron.**—Large consumers of Wrought Scrap are apparently endeavoring to avoid the error they made last year at this time, and are now laying in heavy stocks, which they are for the most part purchasing directly from the railroads. They have thus advanced the price of this class of material. The dealers generally have large stocks on hand, for which they await a demand which they regard as certain to come when consumers have exhausted the supply in first hands. Quotations are now as follows for carefully assorted Scrap 7/10 ton of 2000 lb: Railroad Shop or No. 1 Forge, \$21.50 @ \$22.50; Railroad Track, \$20; Mill or No. 1 Wrought, \$16; Light or No. 2 Wrought, \$10.50; Boiler Plates, \$15; Pipes and Flues, \$14; Cast Machinery, \$15.50; Stove Plate, \$11; Cast Borings, \$10.50; Machine Turnings, \$12; Coil Steel, \$17; Leaf Steel, \$18; Locomotive Tires, \$20; Horseshoes, \$22; Axles, \$26; Mixed Country Wrought, \$13 @ \$14.

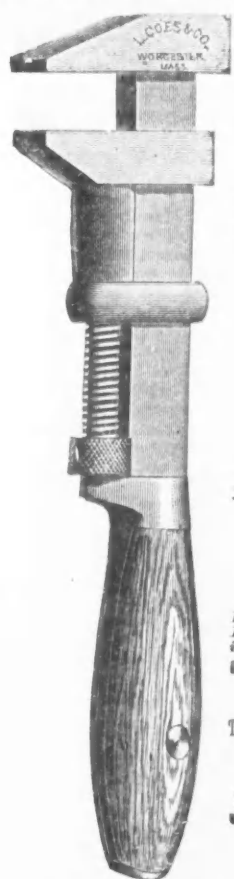
**Nails.**—Manufacturers' agents find but little inquiry for large lots, but jobbers report a good demand for Cut Nails for the time of the year, principally in sort-up lots. Store prices are still \$2.25 for Steel and \$2.15 for Iron. The demand for Wire Nails is excellent, both from manufacturers and jobbers. Prices are firm, with an upward tendency. Jobbers quote \$3.25 for small lots.

**Barb Wire.**—An unusually good demand is reported for the season, with indications cropping out of an excellent fall trade. The prediction is made by careful observers that more Wire will be sold between now and the close of the year than has been the case for a long time. Prices are very firm, with an advancing tendency in consequence of the



Dispatches from Birmingham report that the Briertield Coal and Iron Company, of Briertield, Ala., is embarrassed.





**L. COES'**  
GENUINE IMPROVED  
**Knife Handle**  
PATENT

**Screw Wrenches**

MANUFACTURED BY  
**L. COES & CO.,**  
Worcester Mass.

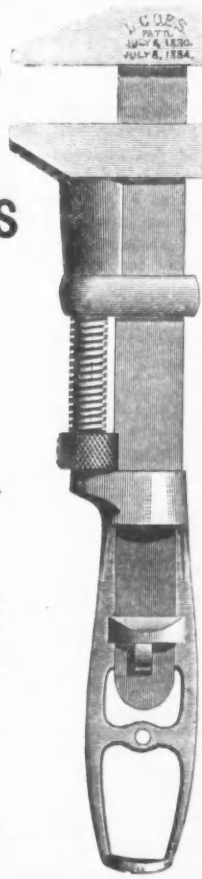
ESTABLISHED IN 1830.



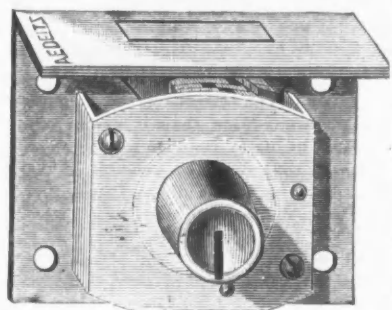
Sectional view illustrates our NEW  
KNIFE HANDLE, showing Malleable  
Iron Frame and Shank of Bar keyed  
into position.  
Straight Bar, Extra LONG NUT  
FOR SCREW IN JAW

The Best Made and Strongest Wrench in the Market  
Send for Illustrated Price List and Circular.

**J. C. McCARTY & CO.,**  
NEW YORK,  
Sole Agents.



**A. E. DEITZ.**



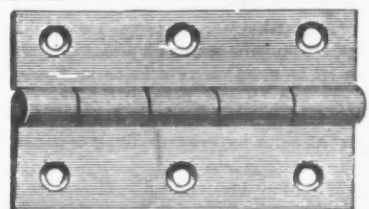
No. 51 Lock.

**J. C. McCARTY & CO., Agents,**

97 Chambers and 81 Reade Sts.,

NEW YORK.

Factory, BROOKLYN, E. D., N. Y.



**W. & J. TIEBOUT,**

MANUFACTURERS OF

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**HARDWARE.**

Nos. 16 & 18 Chambers Street,

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ALWAYS GIVES THE  
UTMOST SATISFACTION.

Main Belting Co.,

Manufacturers of

THE LEVIATHAN

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BELTING.

Unsurpassed for  
Strength, Durability and  
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Made to any Length,  
Width and Strength.

Main Driving Belts.

Guaranteed to Run  
Straight, Even Through-  
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No Cross Joints, Un-  
affected by Damp.  
Clings well to the Pulley.  
Has no equal. In fact,  
is THE BELT.

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COMPANY,

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Also  
248 East Randolph St.,  
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The "Superior Wringer."

(Iron Frame.)



Fully Warranted. Has Patent Adhesive Rolls,  
Best Steel Springs, Malleable Iron Crank.

Send for fully illustrated Catalogue and Price-  
List of thirty different styles and sizes of Wringers.

**BAILEY WRINGING MACHINE CO.**

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For Engines, Machinery, &c.

This paint being entirely free from acid will not  
corrode or rust the iron.

**PATENT IRON FILLING.**

A composition for filling for Tools, Machinery, Engines,  
Locomotives, Trainers, Iron Ships, and all iron work  
for buildings, inside or out. Send for sample card,  
price list and testimonials. FULTON, RAU & SIOLEY,  
Nos. 130, 132 and 140 North 4th St., Philadelphia.



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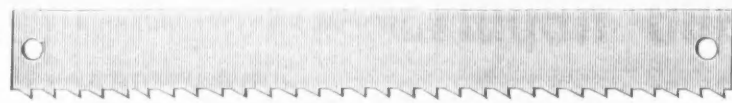
The best quick lift made. Quickest,  
lightest and cheapest.

Three sizes 500, 1000 and 2000 lbs. Just  
the thing for quick lifting at a lowering.

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ence.

**ENERGY MFG. CO.,**

1115 to 1123 S. 15th Street,  
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ANY HARDWARE DEALER

in any place can have all the trade in

**BUTCHER SAW BLADES**

if he will take the trouble to show the Star Blades to the Butchers and per-  
mit them to try their quality. There is not a single place where these Blades  
have been used that they have not taken and held the market. They can be  
sold for 10 Cents each, and that is less than the cost of filing a common  
saw. They are so hard that one will cut three or four times as long as the  
saws now in use without filing. As these Saws are not to be filed, and as  
one only lasts a few months before getting dull, a great many of them are  
wanted. They are listed on the 50th page of our new Catalogue which we  
will send on demand.

**MILLERS FALLS CO., 93 Reade St., New York.**

**STAR BUTCHER ★ SAW BLADES.**

Length.	Width.	Gauge.	Teeth to Inch.	Per Dozen.
14 and 16 in.	1/2 in.	24	9 1/2	\$1.08
18 " 20 "	3/4 "	24	9 1/2	1.20
22 " 24 "	1 " 3/4 "	24	9 1/2	1.32



**CHAMPLAIN**

Forged Horse Nails.

MANUFACTURED BY THE

**NATIONAL HORSE NAIL CO.,**

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST  
NORWAY IRON AND WARRANTED.

WAREHOUSE

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**J. C. McCARTY & CO. Sole Agents.**

**INDURATED FIBRE WARE.**  
**SEAMLESS**

Pails,  
Tubs,  
Basins,  
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Milk Pans,



Spittoons,  
Umbrella Stands  
Water Coolers,  
Slop Jars,  
&c., &c.

Molded in one piece from wood pulp. Treated chemically, giving great  
strength and durability, and at same time making the ware impervious to  
liquids, hot or cold. Being neither painted nor varnished it will not impart  
taste to anything put in it, and will not further absorb liquid or odor so as  
to become heavier or foul. Is very light. Has no hoops to drop or rust off.  
Warranted absolutely seamless and unaffected by extremes of weather.

EVERY ARTICLE WARRANTED.

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Manufacturers of Stamped Brass, Silvered and Tin Goods, Hyatt's Patent Brass and Iron Spring Bolts,  
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**MILLS.**

**EMERY**

**SOUTH WALPOLE, MASS.**

**Hardware Dealers Take Notice,**

and buy where you can get the best quality at the lowest price,  
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Our Eureka Patent Flexible Back Saws, the teeth of which are  
hard, the back being soft, thereby preventing them from breaking  
in two, have been greatly improved and are giving the best sat-  
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through with uniform temper, and are the best Hack Saws so  
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Saws on our recommendation, as we give them the option of re-  
turning the first lot to us at our own expense any time within  
three months from date of invoice. Correspondence solicited.

**Henry G. Thompson & Sons,**

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**Flexible Back Band Saws for Cutting Metals,**

Hack, Meat and Kitchen Saws and Frames.

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LIMITED,

Factory,  
SEYMOUR, CONN.

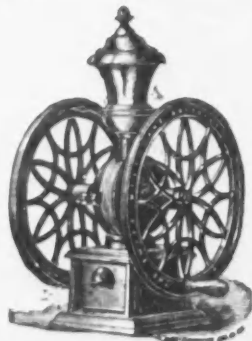
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Telephone Call,  
"PEARL 233."

**TIN ZINC,**

W. J. WILDER'S PATENT, March 10th, 1885.

A New Metal especially adapted for Roofing, Lining Refrigerators, the Manu-  
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ESTABLISHED 1845.

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of coffee. They are highly ornamental, and workmanship of the ver-  
best. We make more than 30 styles.

ALSO, LANE'S PORTABLE COFFEE ROASTER.

Will roast 30 to 40 lbs. at once, and can be used as a stove at other  
times. Send for descriptive list to Manufacturers.

**LANE BROS., Poughkeepsie, N. Y.**

Also Sold by Leading Wholesale Houses.

Our agents, John H. Graham & Co., 113 Chambers St., New York  
carry a full line of our goods, and will be pleased to serve you at  
factory prices.

**ALEXANDER BROS**  
**BEST OAK BELTING**  
PHILADELPHIA.



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**The T. H. Bullock,**  
**ELLOWS** The Best for **FORGES**  
the Money.  
**(CLEVELAND, OHIO,**





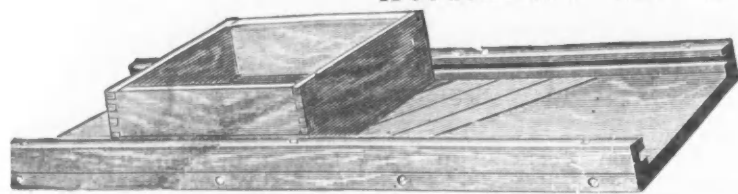


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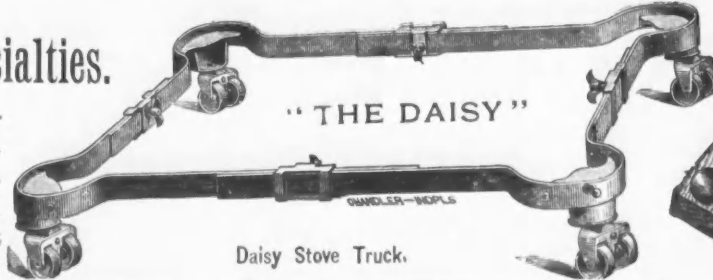
MANUFACTURERS OF

Kraut and Saw Cutter.

Woodenware and Hardware Specialties.



Write for  
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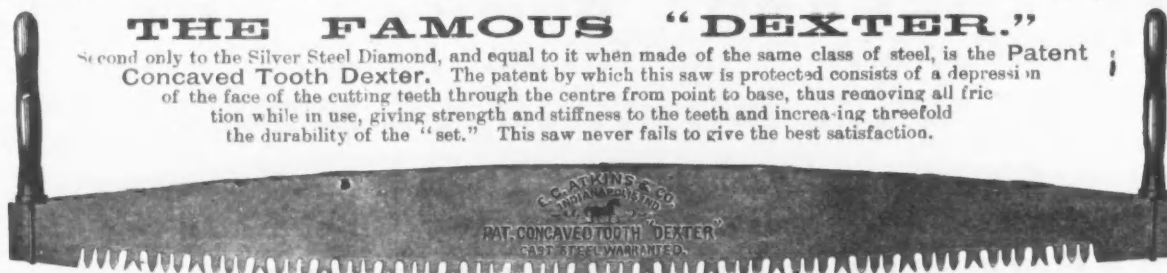
Daisy Stove Truck.



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### THE FAMOUS "DEXTER."

Second only to the Silver Steel Diamond, and equal to it when made of the same class of steel, is the Patent Concave Tooth Dexter. The patent by which this saw is protected consists of a depression on the face of the cutting teeth through the center from point to base, thus removing all friction while in use, giving strength and stiffness to the teeth and increasing threefold the durability of the "set." This saw never fails to give the best satisfaction.



Ground substantially uniform gauge on the toothed edge, and any gauge required on the back.

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Cross-Cut, Circular, Band and Gang

## SAWS

Are Everywhere Recognized as the  
Standard of Excellence.

WESTERN AGENCY FOR

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OF SUPERIOR QUALITY AND FINISH.

### SMALL IRON CASTINGS,

Warranted Soft, Sound, Smooth, Strong and True to Pattern.  
Carefully Inspected, Cleaned and Tumbled.

FINE MACHINERY CASTINGS.

HARDWARE SPECIALTIES.



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Cast Jack Screws, Bench Anvils and Stove Pipe Thimbles.

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Freight paid to principal points in New England and New York. Correspondence Solicited.

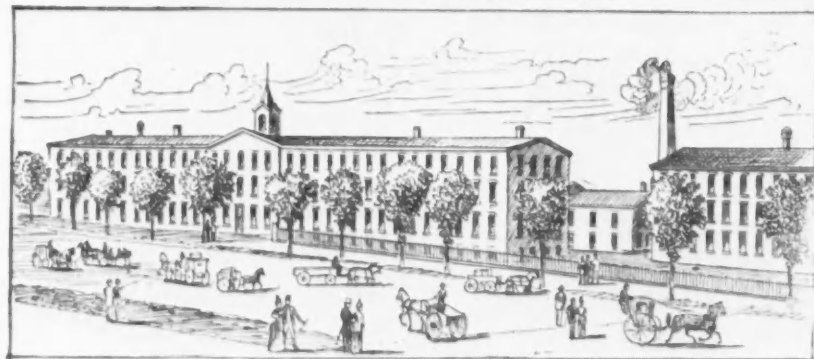
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Boston Office, 141 A Milk St. H. F. LIVERMORE, Agent.



## MARLIN DOUBLE-ACTION REVOLVER.

For Sale or To Let, Factory Property, at Whitestone, L. I.



This property covers 28 to 30 city lots, with a frontage on three streets, convenient for water or railroad transportation. Extra inducements offered by the Long Island Railroad, including a switch directly in to the works. The buildings are of brick, substantially built, three stories high, with plenty of light and air. The engine, boiler, shafting, and gas machine are all in perfect order, and ready to start at a moment's notice. The location is healthy, and plenty of help can be obtained from the surrounding country. Time, one hour from New York City. Diagram, map, table & full particulars furnished on application.

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We desire to call the attention of the public to our New Double-Action Revolver illustrated herewith. No expense or care has been spared to make this arm as near perfection as it is possible to get. The style is identical with the Smith & Wesson Revolver and in no respect whatever is it inferior. Our Rifles have enjoyed the reputation of being superior in workmanship, finish and accuracy of shooting to any others in the world; this position we mean to hold, and the Marlin Revolvers will be found to be in these points, so essential to a high class firearm, equal to anything we have heretofore made. Realizing the immense hold that the S & W. Revolvers have on the markets of the world, by having for a long series of years stood alone as perfectly made weapons, we have made our price sufficiently low to attract the notice of the trade and of the public, feeling confident that as soon as they are sufficiently known they will be duly appreciated and will command as high an estimation as any other goods the world over.

For the present, the 38 cal. will be the only size made, to be followed soon by the 32 cal.

The cartridge used is that known as 38 S. & W., which can be found everywhere. As shown in the cut, the cartridges are extracted automatically by a simple device, and the Revolver can be opened without extracting, if desired. The construction has several novel features which are covered by patents, which bring the Revolver up to highest standard attainable for strength, simplicity, durability, and ease of manipulation.

Retail Price, Rubber Stock, Nickel Plated or Blued, \$11.00.

DISCOUNT TO THE TRADE.

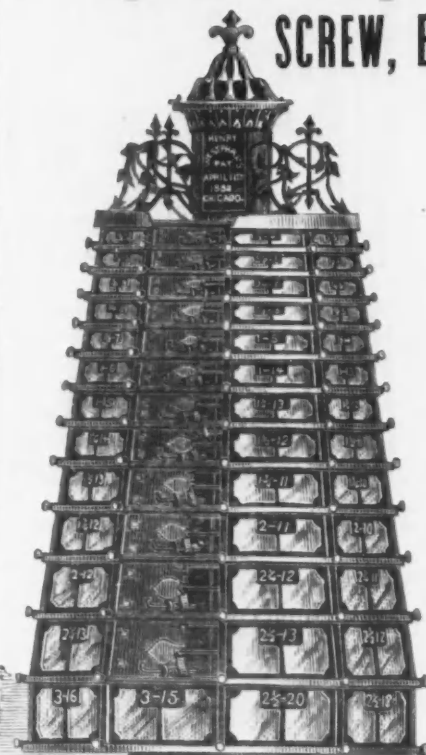
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MARLIN & BALLARD RIFLES,  
MERRILL BICYCLE LOCKS and  
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## Westphal's Improved Revolving SCREW, BOLT AND SHOT CASES.



IMPROVED REVOLVING SCREW CASE.

Most useful and ornamental fixtures for a hardware store. With their use it is impossible to mix different sizes.

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## THE NEW EASY LAWN MOWER.

The leading mower in the market.  
Front Cut. Steel. Open  
Roller Traction. Easy  
and Noiseless in  
Operation

The only mower that will  
cut Wet Grass, Narrow  
Borders, and close to walls  
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every particular.



Medium Size "NEW EASY."

## LAWN MOWER. The New Model

Our Latest & Best  
MOWER.

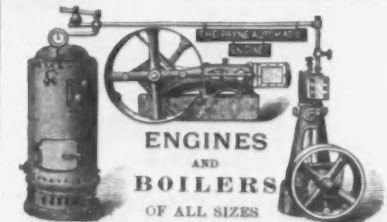
For Simplicity, durability, and quality of work it is unequalled, while for Lightness of draft it excels, by a large per centage, any other Lawn Mower made.

CHADBORN & COLDWELL  
MANUF'G CO.  
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## "The World's Favorite" IS COVERT'S UMBRELLA RACK.

Something that everybody wants at sight for their Church Pew, Office, Store, Dwelling and Piazza. It entirely prevents a wet umbrella from soiling anything. The frame is wire, and the drip pan metal, and finished in c. plate, or japanned. The drip-pan rests by its rim, therefore easy to detach. The rack is held in place by two screw books which go with it. The price brings it within the means of everybody. The demand for this useful article is world wide, and the invention will be fully covered by letters patent in every civilized country. Order of your Jobber. Price per doz., \$5.00. Will send sample on receipt of price.

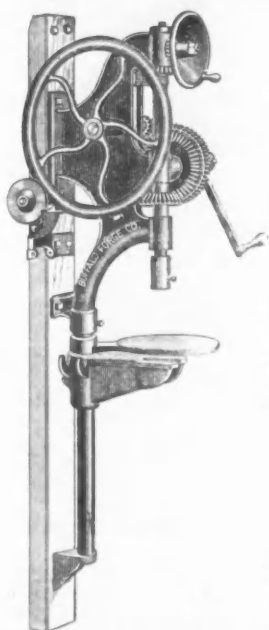
The E. COVERT MFG. CO.  
Farmer Village, N. Y., U. S. A.



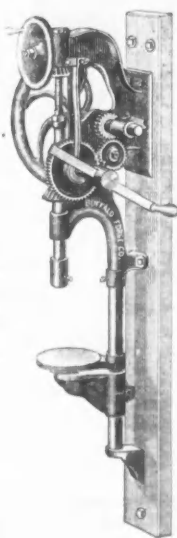
Write for Circular and tell us what you want.  
B. W. PAYNE & SONS, Drawer 36, ELMBURN, N. Y.  
10 S. Canal St., Chicago, Ill. 49 Dey St., New York.  
Our patented Vertical Boiler will not prime. No danger of burning flues.



## Buffalo Blacksmith Drills.



Complete line of various sizes and styles for every class of work.



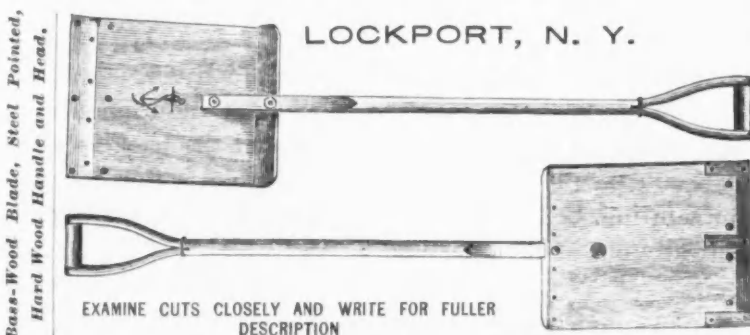
All gears machine cut, making them the smoothest and easiest working Drill in the market.

Send for complete Catalogue.

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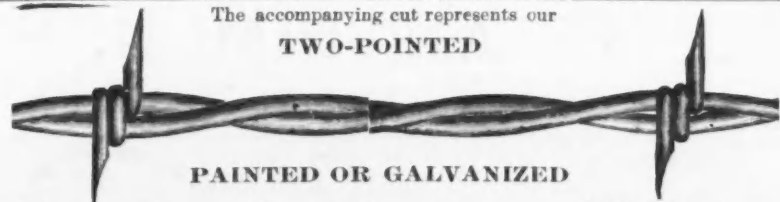
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EXAMINE CUTS CLOSELY AND WRITE FOR FULLER DESCRIPTION

N. Y. Agency, **HENRY B. NEWHALL COMPANY.**

The accompanying cut represents our  
**TWO-POINTED**



**Barbed Fence Wire.**

MANUFACTURED BY  
**OHIO STEEL BARB FENCE CO., CLEVELAND, O.**

Cut of our four-pointed wire will appear next week. Prices lowest. Quality best. Correspondence solicited.

**THE EMPIRE METAL SPIRIT LEVEL, WITH DOUBLE PLUMB.**  
Glasses are Immovable. No Parts to Work Loose. Glasses Perfectly Protected. Made Entirely from One Piece.



Patented Dec. 7, '86.  
Send for catalogue and price list.

The Most Durable, Simple in Construction and Cheapest Iron Level on the Market.  
Manufactured by **GREENE, TWEED & CO., 83 Chambers St., New York.**

**HUSSEY, BINNS & CO.**

(LIMITED),

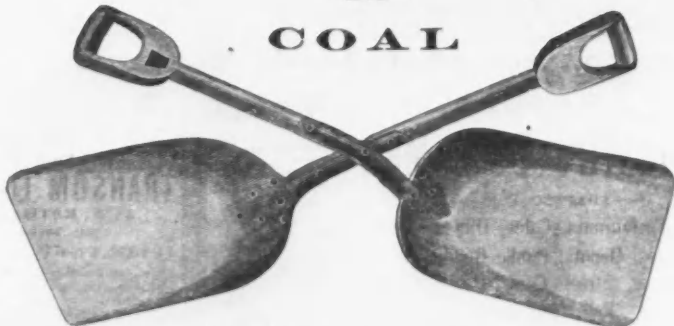
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MAKE A SPECIALTY OF

**Railroad, Contractors' and Miners' Shovels,**

—AND—

**COAL**



Also call special attention to their

**NEW PATTERN SMOOTH BACK COAL BARGE SCOOP.**



Prices Quoted on Application.

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**VULCANIZED FIBRE CO.,**

Sole Manufacturers of

**Hard Vulcanized Fibre,**

For Electrical Insulation, Friction Brakes, Engine Cibs and Mechanical Uses.

**Flexible Vulcanized Fibre,**

For Water and Oil Packings Pump Valves, Carriage Axle Washers and General Purposes.

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Successor to C. F. Dewick & Co.,

Manufacturer of

**PATENT STEEL**

**Toe Calks,**



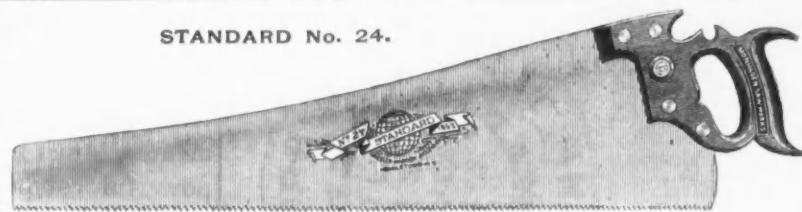
360 Dorchester Avenue, Boston, Mass.

**HOLLOW**

**THIN**

**BACK.**

STANDARD No. 24.



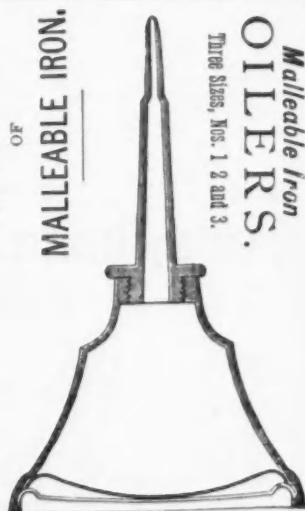
LIST, \$20 PER DOZEN.

**WHEELER, MADDEN & CLEMSON MFG. CO.,**  
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**VIRGINIA NAIL AND IRON WORKS COMPANY,**  
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**NAILS and Bar Iron of Superior Finish, made exclusively from Pig Iron.**

Patented Articles  
OF  
**MALLEABLE IRON.**



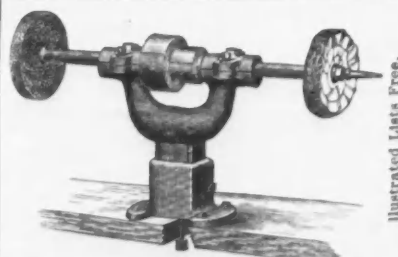
New Improved  
Malleable Iron  
PATENT  
Three Sizes, Nos. 1, 2 and 3.

**Hammer's** Adjustable Clamps.  
Mail. Iron Hand Lamps.  
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New Pattern Heavy Screw Clamps.  
Strongest in the market.

For Sale by all the Principal Hardware Dealers.  
SEND FOR PRICE LIST.  
**MALLEABLE IRON CASTINGS**  
of superior quality, and Hardware Specialties  
in Malleable Iron, made to order.

**HAMMER & CO., Branford, Conn.**



**Adjustable Buffers and Grinders,**  
SPINNING LATHES, CIRCULAR SAWS, &c.  
P. FRYBIL, 467 W. 40th St., New York.



The Strongest and Best Wheelbarrow is  
**DREYFUS'**  
**Corrugated Steel Wheelbarrows.**

**J. G. Dreyfus & Co.,**  
56 Park Street New York.

Hudson's "Rocking Table"  
**APPLE PARER.**



**Livingston Nail Co., Agents,**  
104 Reade Street.  
New York.

Extra Temper.  
Superior Finish.  
Patent Handle

The best and cheapest Hand  
Saw in the market.

**Gate City Stone Filter Co.,**

Office and Salesroom at

**46 Murray Street,**

Manufactory and Depot at

**UNION PORCELAIN WORKS,**  
GREENPOINT, N. Y.

Impure Water is Poison. Best  
Filter ever Invented.



Price \$3.75 to \$41.25 each,  
according to size and style.



This open cut represents  
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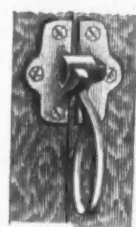
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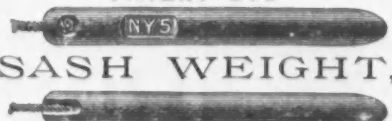


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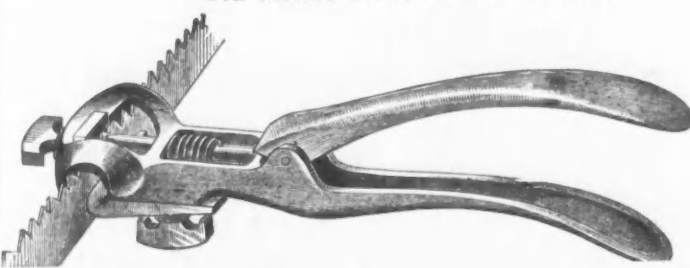
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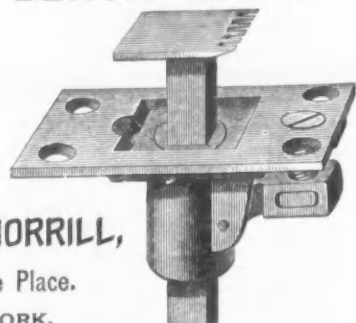
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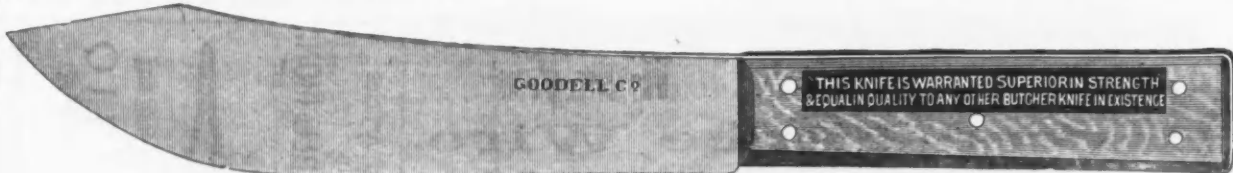
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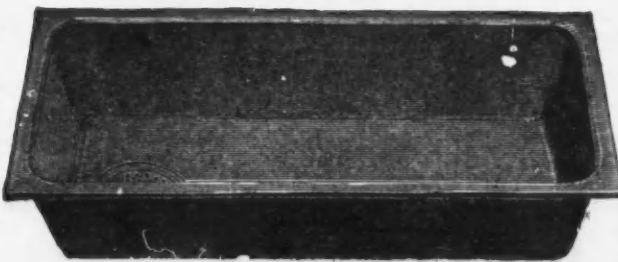
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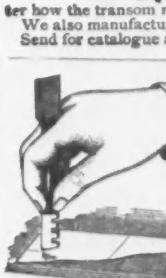
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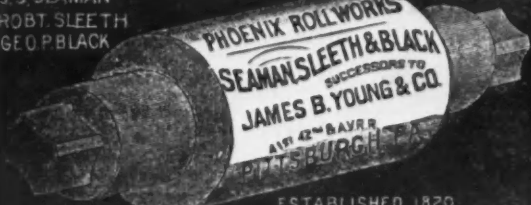
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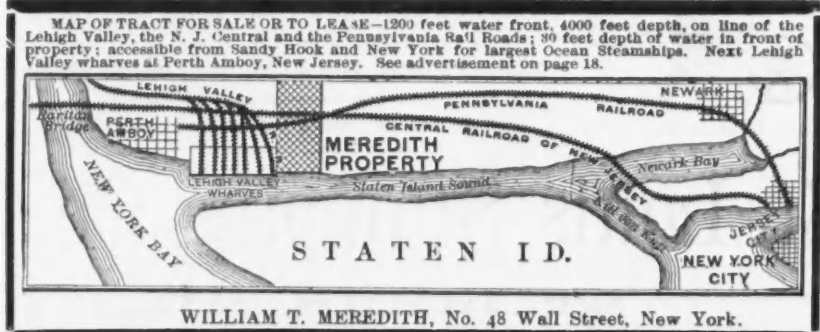
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AND

Edge Pressed Furnace Blocks,

Clay Retorts, Tiles, &c.

Twenty-third Street, Above Race, PHILADELPHIA.

Twenty years' practical experience.

ESTABLISHED 1845.

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All dimensions of Firebricks and Shapes,

Fire Clay for Furnaces, Coke Ovens, Boil-

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of all Shapes and Sizes.

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Manufacturers of

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Made of Malleable Iron. Patent Oscillating Trucks. All Wheels Turn. Perfect Action

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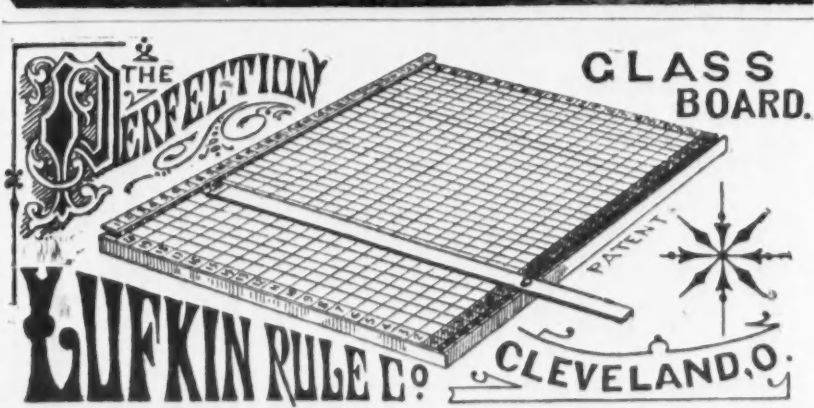
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WITHOUT NAILS OR SCREWS.  
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PAPER BOXES ALL KINDS FOR HARDWARE.



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**LANE'S PATENT STEEL DOOR HANGER.**

The most perfect Anti-Friction Hanger in the Market,

**BECAUSE**

It is made of steel throughout, except the wheel which has a

steel axle. It will not break. It is practically free from wear. It

is almost noiseless in action. It requires no oil. It has a broad

bearing on the door, and keeps in line. It is by far the most

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Is made of steel and is easily put in position. Catches and holds

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Solid braided Lines for Window Cord, Rail-

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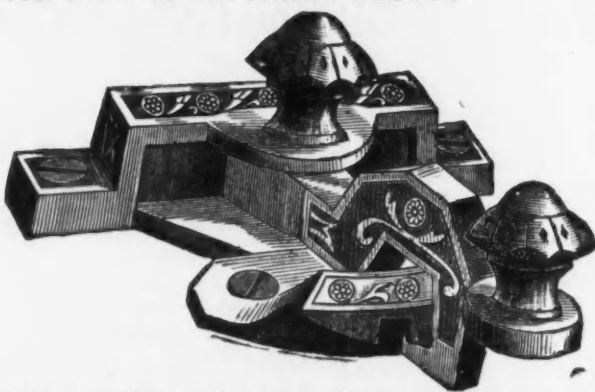
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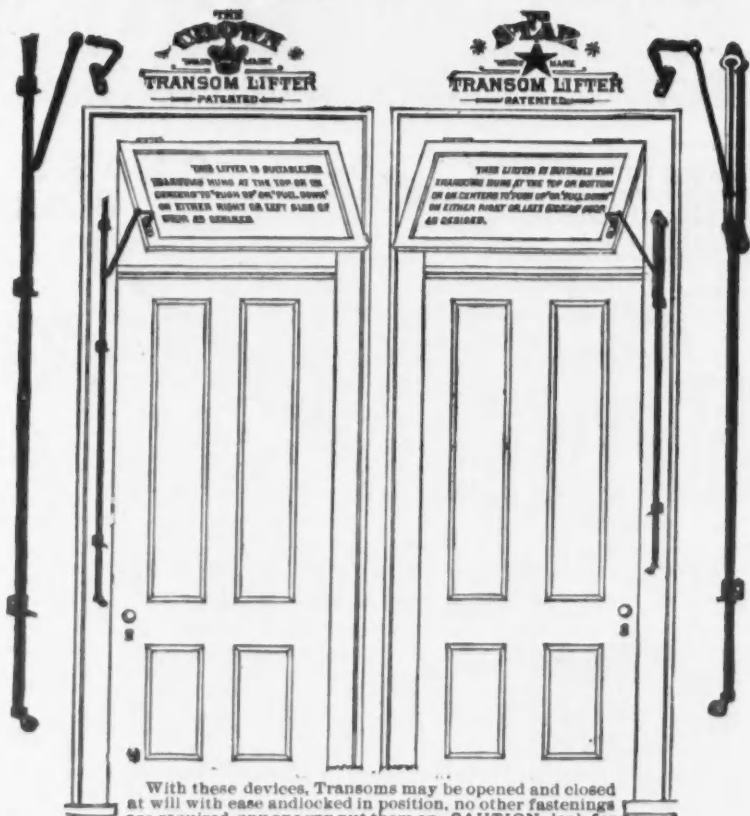
BROUGHTON'S  
BURGLAR-PROOF SASH LOCKS.

Patented Oct. 7th, 1879.



### UPRIGHT RIM KNOB LOCKS, WITHOUT KNOBS.

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|---|--|
| No. 308 4-inch, 2 Polished Iron Bolts, Copper<br>Bronzed Key, 1 tumbler, 12 changes, with stop, 1.07                                | No. 317 4 1/2-inch, 3 Bolts, all Iron, Copper<br>Bronzed Key, 1 tumbler, 12 changes, with stop, 1.47                     |
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| No. 312 4-inch, 2 Polished Iron Bolts, 1 tumbler,<br>12 changes, with stop, Brass Key, 1.37   | No. 319 4 1/2-inch, Brass Bolts and Key, 1 tumbler,<br>12 changes, with stop, Patent Reversible Latch 2.22               |
| No. 313 4-inch, 2 Polished Iron Bolts and Key, 1 tumbler,<br>12 changes, with stop, Brass Key, 1.79                                 | No. 420 5-inch, all Iron, 2 Bolts, 1 tumbler, 12<br>changes, with stop, Patent Reversible Latch 1.92                     |
| No. 314 4 1/2-inch, 2 Polished Iron Bolts, Copper<br>Bronzed Key, 1 tumbler, 12 changes, with stop,<br>Patent Reversible Latch 1.67 | No. 421 5-inch, 2 Polished Iron Bolts, Brass Key,<br>1 tumbler, 12 changes, with stop, Patent Re-<br>versible Latch 2.17 |
| No. 315 4 1/2-inch, 2 Polished Iron Bolts, Brass<br>Key, 1 tumbler, 12 changes, with stop, Patent<br>Reversible Latch 1.37          | No. 422 5 1/2-inch, Brass Bolts and Key, 1 tumbler,<br>12 changes, with stop, Patent Reversible Latch 2.97               |
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- Special net prices to be found in Iron Age whenever changes occur.  
The only manufacturers in the United States who quote bottom prices to all dealers without favoring  
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Fine Gray Iron Castings of every description, also Real Bronze and Brass Castings, made to order: very  
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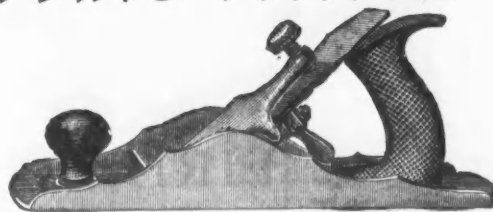
With these devices, Transoms may be opened and closed  
at will with ease and locked in position, no other fastenings  
are required, any one can put them on. CAUTION, look for  
the Trade Mark on the handles.  
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sizes as are listed below, which are suitable for house and office transoms, and hope  
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No.	Length	Size of Rod	Price Each.	No.	Length	Size of Rod	Price Each.
43	3 feet	3/4 x 1/2	Bronzed Iron, \$0.55	83	3 feet	3/4 x 1/2	Bronzed Iron, \$0.70
44	4 "	"	" 0.65	84	4 "	"	" 0.80
45	5 "	"	" 0.75	85	5 "	"	" 0.90
46	6 "	"	" 1.00	86	6 "	"	" 1.00
47	7 "	"	" 1.15	87	7 "	"	" 1.15
48	8 "	"	" 1.30	88	8 "	"	" 1.30
49	9 "	"	" 1.45	89	9 "	"	" 1.45
50	10 "	"	" 1.60	90	10 "	"	" 1.60

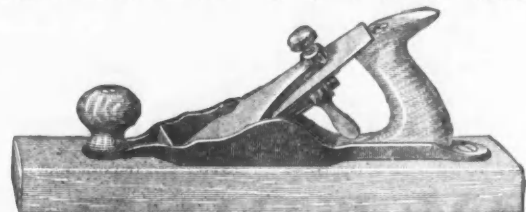
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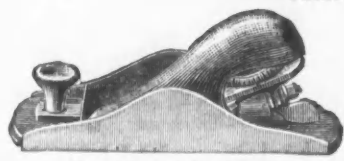
## CHAPLIN'S PATENT IRON AND WOOD BOTTOM PLANES.



Jacks and Jointers:



Jack Plane.—Nos. 77, 78.



Nos. 20 and 30 Blocks.

These planes (with a smooth face) have been in the  
market for many years, obtaining a steadily increas-  
ing trade as they have become known. We claim  
for them the utmost simplicity of construction,  
prompt adjustment and superior beauty of style and  
finish.

The clamp plate and lever are nickel-plated; the  
handle is of checkered rubber, which is stronger than  
any wood handle, and affords an easy, firm grip—  
also made with nickled iron handle.

Corrugated face.	Smooth face.	No.	Price
No. 202, Iron Smooth Plane, 7x1 1/2 in. Cutter, \$3.00	No. 211, Iron Jointer Plane, 24x2 1/2 in. Cutter, \$6.75		
No. 203, Do. do. 8x1 1/2 in. do. 3.50	No. 212, Do. do. 24x2 1/2 in. do. 7.50		
No. 204, Do. do. 9x1 1/2 in. do. 3.50	No. 213, Do. do. 24x2 1/2 in. do. 7.50		
No. 205, Do. do. 10x1 1/2 in. do. 3.50	No. 214, Do. do. 24x2 1/2 in. do. 7.50		
No. 206, Do. do. 11x1 1/2 in. do. 3.50	No. 215, Do. do. 24x2 1/2 in. do. 7.50		
No. 207, Do. do. 12x1 1/2 in. do. 3.50	No. 216, Do. do. 24x2 1/2 in. do. 7.50		
No. 208, Do. do. 13x1 1/2 in. do. 3.50	No. 217, Do. do. 24x2 1/2 in. do. 7.50		
No. 209, Do. do. 14x1 1/2 in. do. 3.50	No. 218, Do. do. 24x2 1/2 in. do. 7.50		
No. 210, Do. do. 15x1 1/2 in. do. 3.50	No. 219, Do. do. 24x2 1/2 in. do. 7.50		



Smooth Plane, Corrugated Bottom.

This Cut shows the surface of our new  
Corrugated Iron Planes. The corrugations  
afford ample air spaces, and reduce the  
traction and friction to the minimum.  
Same price as smooth face.

## OUR NEW WOOD BOTTOM PLANES.

The Clamping Plate and Lever are nickel-  
plated; the Beechwood has been thoroughly  
seasoned and is a thicker block than usual,  
though the Plane is no heavier than those  
already in the market.

No. 72, Smooth Plane, 7 x 1 1/2 inch Cutter, \$1.00	No. 73, " " 8 x 1 1/2 " " " 2.00
No. 74, " " 9 x 1 1/2 " " " 2.50	No. 75, " " 10 x 1 1/2 " " " 3.00
No. 76, " " 11 x 1 1/2 " " " 3.50	No. 77, " " 12 x 1 1/2 " " " 4.00
No. 78, " " 13 x 1 1/2 " " " 4.50	No. 79, " " 14 x 1 1/2 " " " 5.00
No. 80, " " 15 x 1 1/2 " " " 5.50	No. 81, " " 16 x 1 1/2 " " " 6.00
No. 82, " " 17 x 1 1/2 " " " 6.50	No. 83, " " 18 x 1 1/2 " " " 7.00
No. 84, " " 19 x 1 1/2 " " " 7.50	No. 85, " " 20 x 1 1/2 " " " 8.00

The Adjustable Mouth Smooth Plane is a new feature,  
and meets with a great deal of favor.

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THE FOLLOWING JOBBERS CARRY A GOOD ASSORTMENT

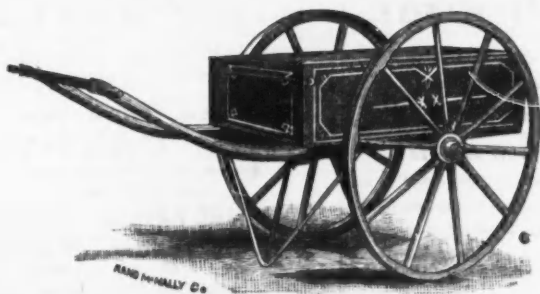
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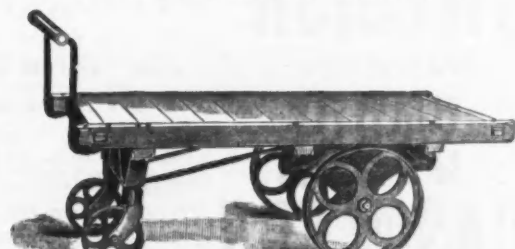
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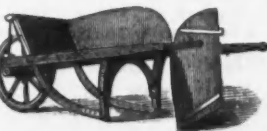


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THE REYNOLDS IMPROVED TRUCK.

Front Wheels Casters. Truck turns in its own length.  
Runs on or off elevator or scales at any angle. Is easily  
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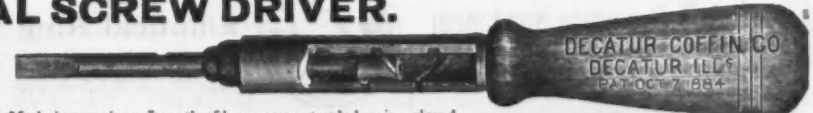
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Fine Black Sheet and Galvanized Iron.

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By pushing on the end of handle it will drive a screw in  
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Made in two sizes. Length of large one extended, 19 in. closed  
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Pulleys, Hangers,  
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Very large stock al-  
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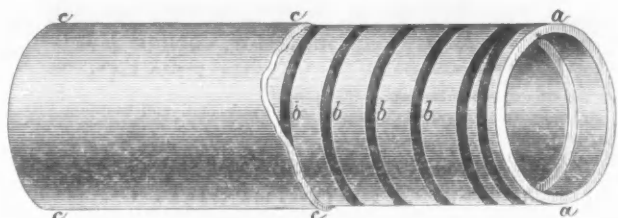


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BRADS OR FINISHING NAILS. CAR NAILS. CIGAR BOX NAILS. TIN AND SLATE ROOFING NAILS. WIRE SPIKES FOR TRACK AND DOCK WORK. WIRE TACKS. BLIND AND BED STAPLES AND LINKS. MCGREGOR NAIL BOXES, AND WIRE NAILS OF ALL KINDS, BARBED OR SMOOTH, PLAIN, TINNED OR GALVANIZED.

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FOR COAL AND IRON MINES, COKE WORKS  
AND GENERAL WATER SUPPLY.

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This Cutter is now upon the market with Improved Cutter Knives, which various trials prove will do double the quantity of cutting per hour with greater ease than any other Cutter or Chopper ever before placed upon the market.

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WITH MUD SCRAPER ATTACHED.



This Brush has but to be seen to be appreciated.

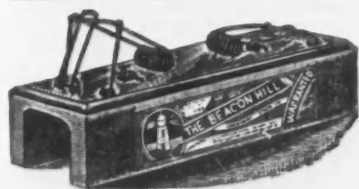
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**WILL OUTLAST A DOZEN OF ANY OTHER KIND.**

This DAUBING BRUSH is made WITH A SCRAPER FOR REMOVING MUD FROM THE CREVICES OF THE SHOES. The utility of this is too apparent to need a word of commendation.

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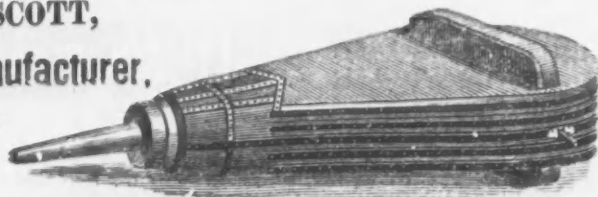


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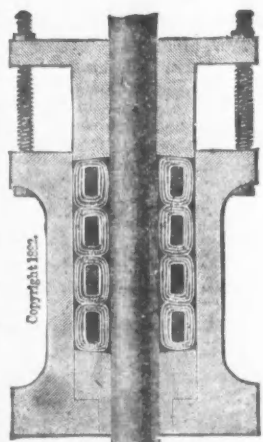
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Johnson Street  
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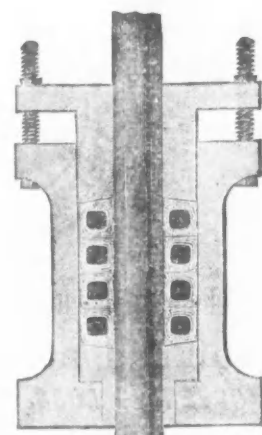


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Sectional view of Stuffing Box, showing packing when first applied



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The genuine Eureka is labeled, every ten or twelve feet, with a red label containing the name "Eureka," date of patent, and register number, and the gum core is always rectangular in shape.

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**JAMES SMITH & CO.,**

MANUFACTURERS OF

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**BEWARE OF IMITATIONS.**

## EXPANDING TAPS



From 3-4 in. to 10 in. Wrought-Iron Pipe Size.

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Manufacturers of

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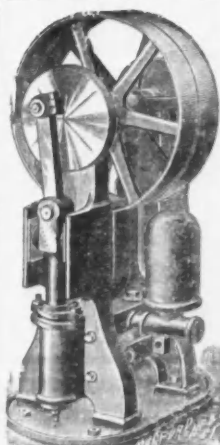
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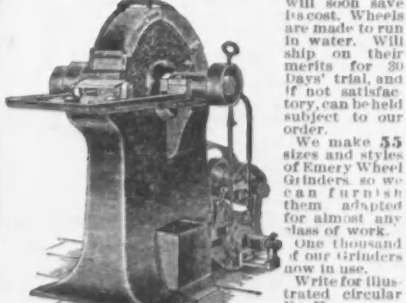
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Shafting, Gearing, Self-Oiling Bearings, Friction Pulleys, Elevators.

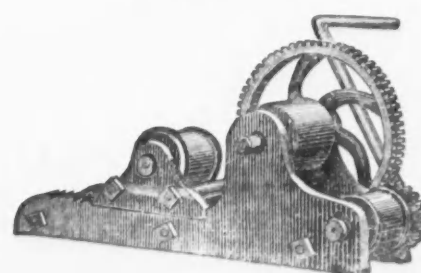
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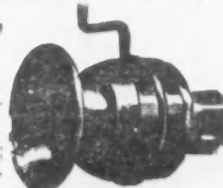
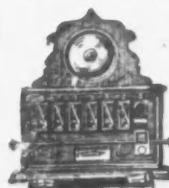
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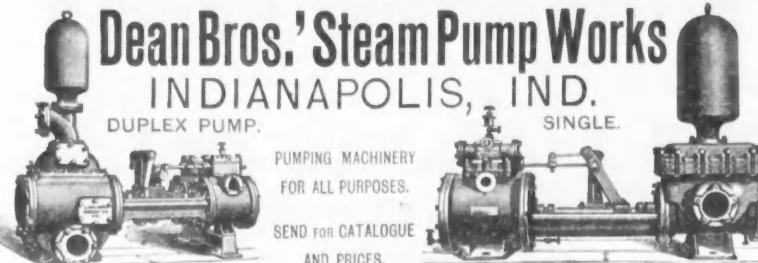
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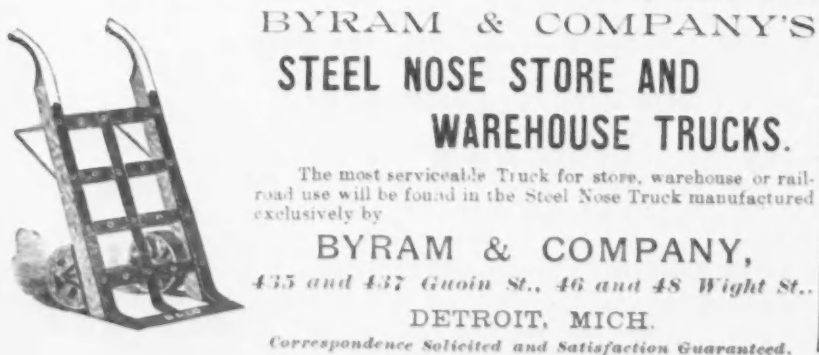
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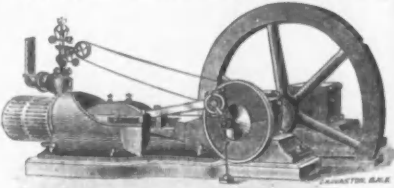
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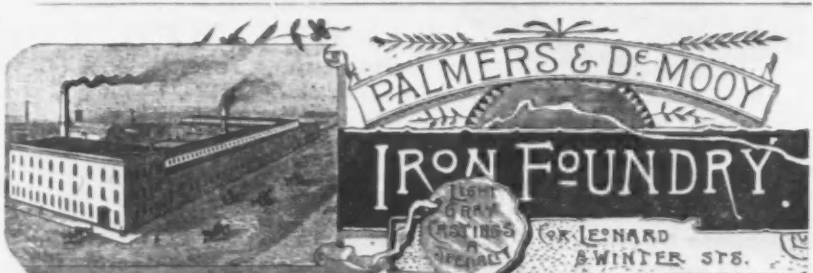
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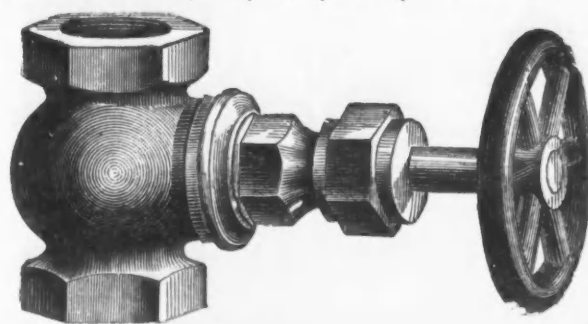
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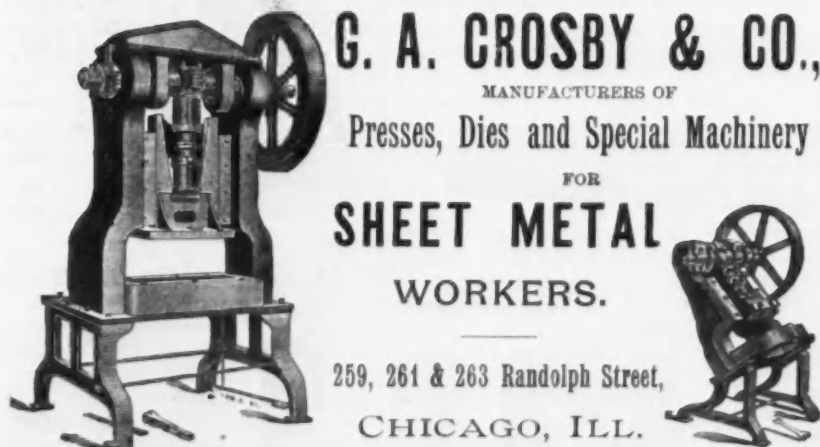
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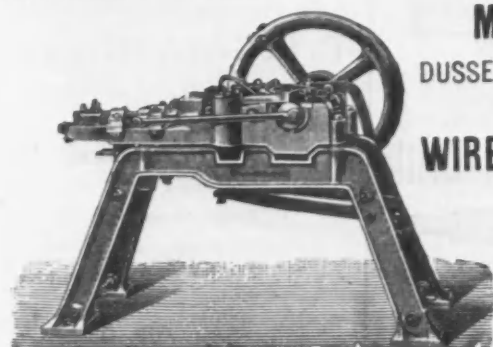
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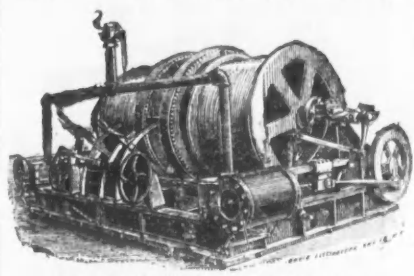
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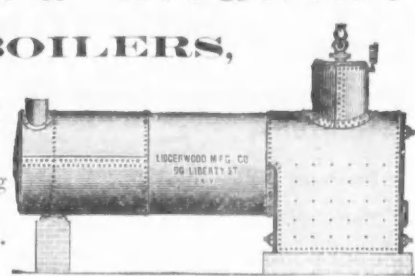
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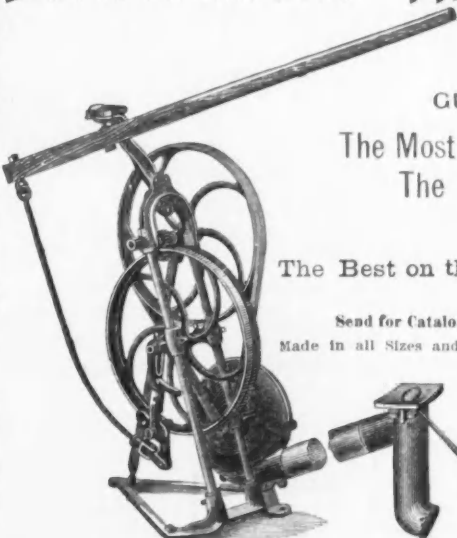
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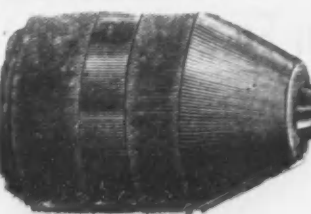
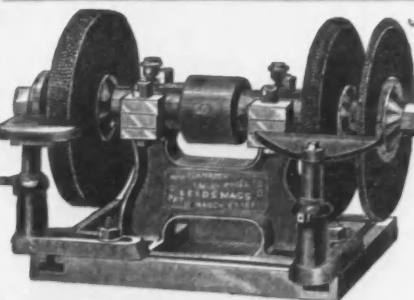
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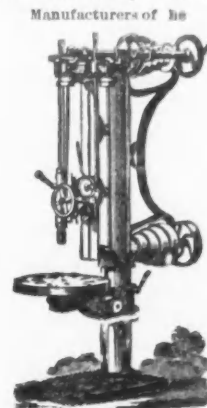
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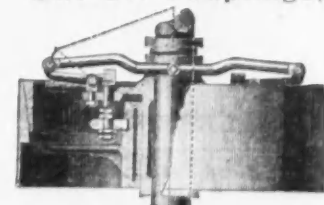
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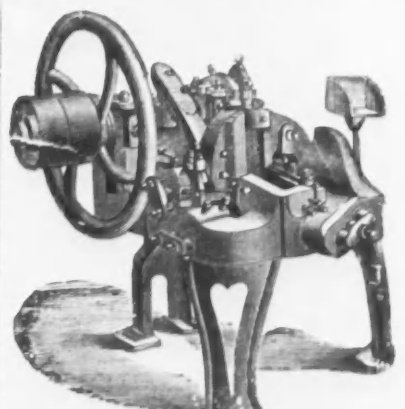
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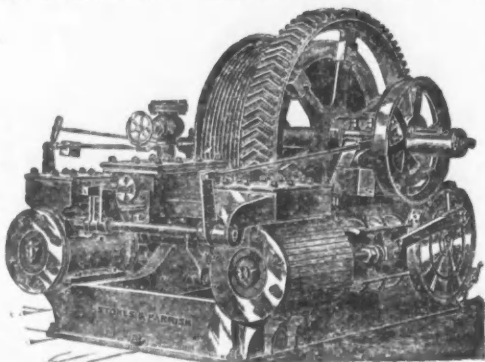
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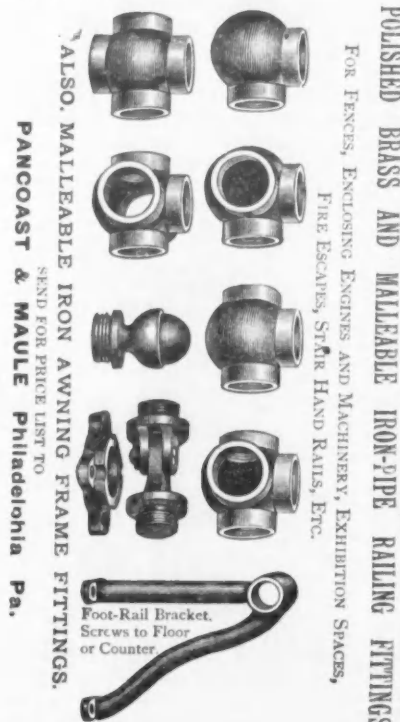
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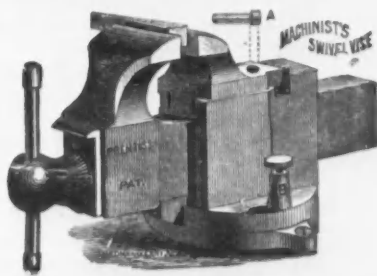
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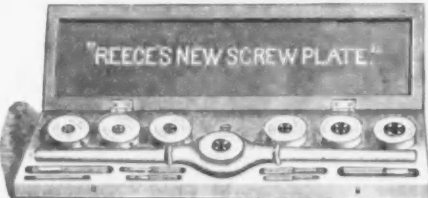
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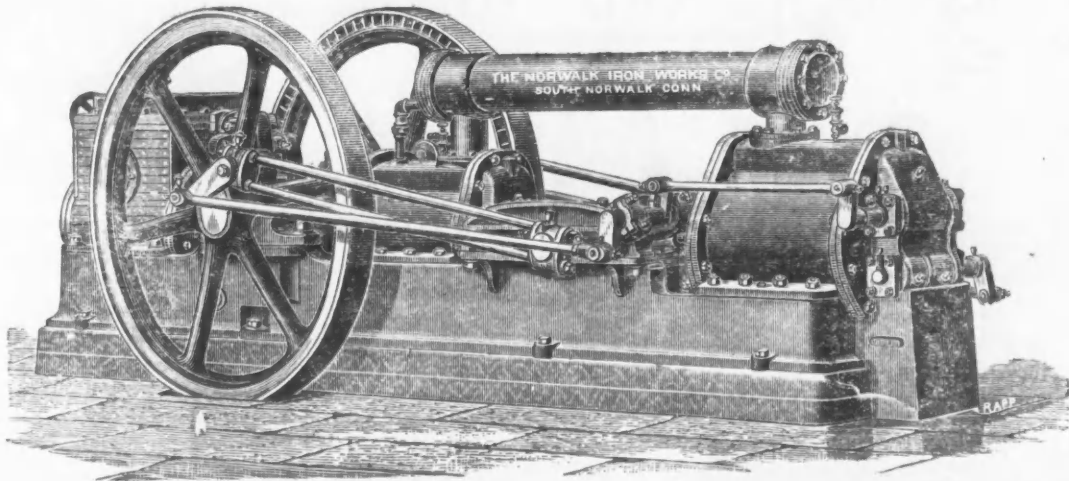
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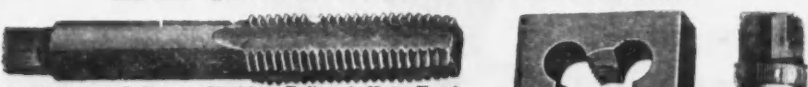
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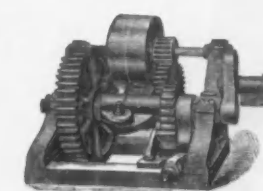
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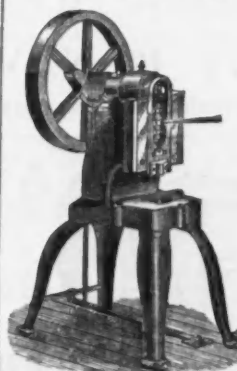
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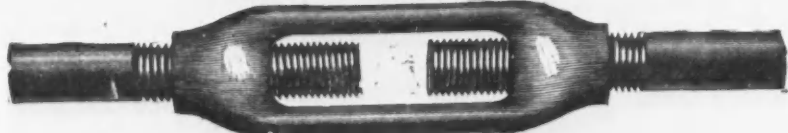
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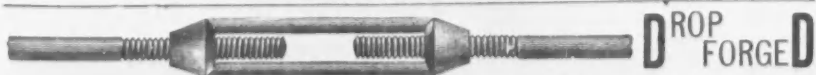
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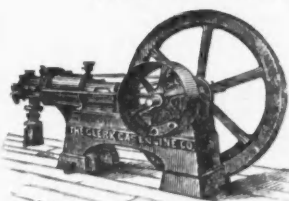
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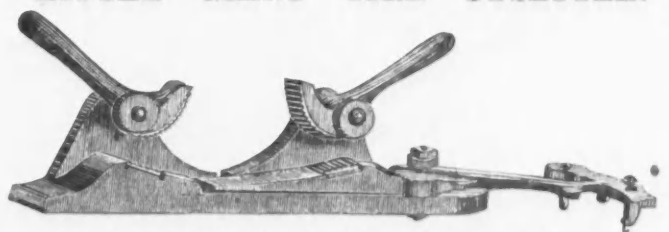
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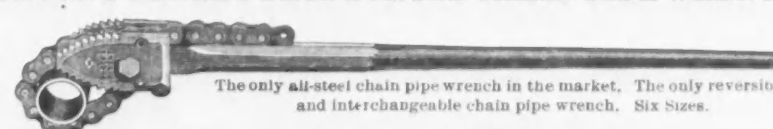
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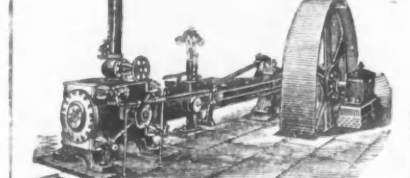
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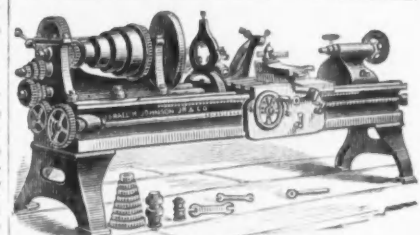
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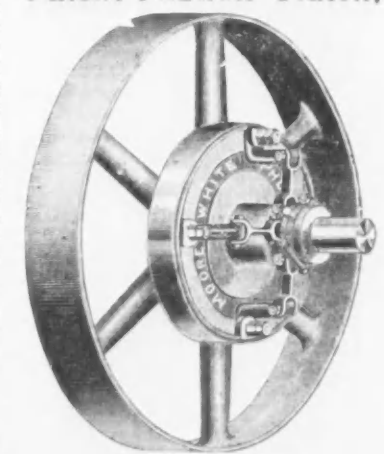
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